

***TIOGA CREEK CT's  
ENVIRONMENTAL ASSESSMENT  
EA: OR125-98-01***

***Umpqua Field Office  
Coos Bay District  
Bureau of Land Management***

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## **Chapter I - Purpose of and Need for Action**

The Umpqua Field Office has reviewed its recent stand exams in the upper Tioga Creek area which indicate that approximately 779 acres of 35-50 year old timber stands in the General Forest Management Area (GFMA) and Riparian Reserve (RR) land allocations could benefit from commercial thinning/density management treatment which would increase growth and vigor of these stands.

This Environmental Assessment (EA) OR125-98-01 addresses site specific, direct, indirect, and cumulative effects of this proposal. This EA is tiered to the *Coos Bay District Resource Management Plan* (RMP) and its Record of Decision (BLM 1995) which is in conformance with the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late Successional and Old Growth Forest Related Species Within the Range of the Northern Spotted Owl* (FSEIS, Interagency 1994) (NWFP) and its Record of Decision (ROD) (Interagency 1994). This EA is also consistent with the EA *To Change the Implementation Schedule for Survey and Protection Buffer Species* (BLM, USFS October 1998).

These documents are available for review at the Coos Bay and North Bend Public Libraries, the Coos Bay District Office of the BLM, the Coos Bay District's Internet Home Page at <http://www.or.blm.gov/coosbay>, and the Oregon State Office of the BLM in Portland, Oregon.

The analysis file for this EA, containing such things as Interdisciplinary team meeting notes, public input, and specialists' reports, is located at the Coos Bay District Office, and is hereby incorporated by reference.

### **Objectives of Thinning Project**

1. Enhance the growth and vigor of the residual stand by removing and utilizing excess trees that would otherwise be lost to mortality due to the high density of the stand, and provide a higher standing live volume and larger trees for future management objectives.
2. Manage RRs by thinning to release understory conifers, increase the growth rate of the residual trees, stimulate the growth of other desirable vegetation, and increase the natural regeneration of conifer and hardwood species.
3. Work towards the goals in the Tioga Creek Key Watershed established by the Transportation Management Objectives (TMO) by decommissioning problem roads or roads unneeded for continued resource management. At a minimum there would not be a net increase in roads.
4. Improve connectivity for late-successional dependent species between the main block of LSR #261 and it's southeast end, and thereby increase the robustness of connectivity habitat between LSR #261 and LSR #259.
5. Redirect the trajectory of stands inside the Riparian Reserve so they will develop characteristics beneficial for late-successional wildlife species, and thus provide refuge areas and re-colonization source areas for the adjacent Matrix lands for the long term.
6. Help provide regional employment and support the timber based economy by producing a predictable and sustainable level of timber sales.
7. Help fulfill the commercial thinning harvest commitment for the Coos Bay District in the GFMA.

The NWFP allocated lands for different primary purposes. The Matrix land use allocation (which include GFMA lands) are Federal lands outside of reserves and special management areas that are available for timber harvest at varying levels. The RR land use allocation is Federal land where riparian dependent resources such as fish, aquatic plants and wildlife receive primary emphasis. RRs also provide habitat for special status and terrestrial species, and provide connectivity between other reserve areas.

## **Proposal**

The Umpqua Field Office proposes to thin 35-50 year old stands of primarily Douglas-fir and western hemlock within the GFMA (commercial thinning) and RRs (density management). The 779 acre project area is expected to remove the suppressed, intermediate, and some of the co-dominant Douglas-fir and Western Hemlock trees competing with each other for growing space (thinning from below).

In addition to the estimated 779 acres within these six sections there are other areas that could also benefit from thinning or density management. These other areas, however, were not included in this proposed project because they are either small isolated, or inaccessible areas, or are units that have a mix of stocking density levels. It is not feasible or economical to plan and layout a thinning for these kinds of areas at this time.

The excess trees would be removed in commercial thinning timber sales tentatively planned for fiscal years 1999 and 2001. The planned sale name, sale fiscal year (FY), estimated acres and locations are listed in the following table.

<b>Sale Name</b>	<b>FY</b>	<b>Estimated Acres</b>	<b>Township</b>	<b>Range</b>	<b>Section</b>	<b>Subwatershed</b>
Beyer's Way CT 1 unit	1999	331	T. 27 S.	R. 9 W.	14, 15, 22	Tioga Creek 93% Cedar Ck. 7%
Deadhorse CT 3 units	1999	144	T. 27 S.	R. 9 W	23, 24	Tioga Creek 83 % Panther Ck. 17 %
Burnt Ridge CT 1 unit	2001	304	T. 27 S.	R. 9 W	10, 15	Tioga Creek 96% Cedar Ck. 4%
Totals		779				Tioga Creek 92% Panther Creek 5% Cedar Creek 3%

The proposed project area is located in T27S., R09W, Sections 10, 14, 15, 22, 23, and 24, Willamette Meridian. The units are in the 6<sup>th</sup> field Tioga Creek, Cedar Creek, and Panther Creek subwatersheds of the South Fork Coos River Analytical 5<sup>th</sup> field watershed (REO No. 1710030401) as shown in table above. Tioga Creek subwatershed is a Tier 1 Key Watershed as defined by the NWFP and a watershed analysis has been completed for this subwatershed. Panther Creek and Cedar Creek are not Key Watersheds. The 1<sup>st</sup> iteration of the draft *South Fork Coos Watershed Analysis* (Dec. 1998) updates the Tioga Creek watershed.

The draft *South Fork Coos Watershed Analysis* which includes analysis of ACS Objectives is hereby incorporated by reference. Additional information such as timber type maps, topographic maps, stand exam, and Timber Production Capability Classification maps are in the Beyer's Way CT, Deadhorse CT, and Burnt Ridge CT timber sale plan folders and are also incorporated by reference.

## **Scoping**

The primary purpose of scoping is to identify agency and public concerns relating to a proposed project and helps define the issues and alternatives that are examined in detail in this EA. The initial scoping process consisted of an ID Team that identified potential issues that may result in the development of alternatives to the proposal. The general public was notified of the proposed project and EA through publication of the District's semi-annual *Planning Update* and letters to adjacent landowners, agencies which have requested these documents, and other interested parties on the District mailing list. Scoping information can be found in the Analysis File.

## **Identified Issues**

Through the scoping process, potential issues were identified by the ID Team, agencies, adjacent landowners, or the public. These issues, shown below, were determined to be minor, and were resolved and/or incorporated into the proposed action.

***Potential issues identified, and eliminated from further analysis***

The potential issues listed below were identified through the public scoping process and inter-disciplinary team discussions:

- Issue 1: Port-Orford cedar (POC) and the spread of *Phytophthora lateralis* (PL).
- Resolution: Recent stand exams of the proposed CT units, and research of previous regeneration timber sales adjacent to the project area indicates there is no POC in the project area.
- Issue 2: Will the District close, subsurface, obliterate, and otherwise fully decommission harmful roads throughout the watershed?
- Resolution: The District has inventoried roads and completed the Transportation Management Objectives (TMO) for the Tioga subwatershed. Roads have been identified for full decommissioning. Road full decommissioning will be accomplished through timber sales or Jobs-in-the Woods appropriated funds.
- Issue 3: Concern that the District does not adequately protect RRs in accordance with the NWFP; and failing to protect resources in its charge including habitat required by old-growth dependent species such as the northern spotted owl.
- Resolution: The Standards and Guidelines of the NWFP allows timber management in RRs: "Apply silvicultural practices for Riparian Reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy objectives"(Interagency 1994, pg. C-32). The Basis for Standards and Guidelines of the NWFP states: " Active silvicultural programs will be necessary to restore large conifers in Riparian Reserves. Appropriate practices may include..., thinning densely stocked young stands to encourage development of large conifers....." (Interagency 1994, pg. B-31). One of the objectives of this proposed project is to thin RRs to improve the growth and vigor of the healthiest trees in the stand.
- The Tioga CT's do not affect old growth habitat as the project includes only second growth stands.
- Issue 4: District's failure to provide late seral habitat.
- Resolution: The late seral habitat reserved on the District has increased substantially since 1994 with the implementation of the NWFP. Approximately 80% of the District's land use allocations are in reserves. Approximately 38% of the District forests are 80+ years old, of which approximately 90% are reserved.
- Issue 5: Coos Bay District is contributing to sociological problems by increasing timber dependence in local communities.
- Resolution: The level of timber harvest on the Coos Bay District has declined with the implementation of the NWFP. This effectively reduces the dependence on timber for local communities; however, the NWFP provides for a level of harvest in order to maintain some economic opportunity and stability.
- Issue 6: The Coos Bay District maintains an illegal interpretation of its mandate and considers its PSQ to be an absolute target.
- Resolution: On page ROD-6 of *Coos Bay District Resource Management Plan* (RMP) and its *Record of Decision* (BLM 1995) the State Director approved the Coos Bay RMP and declared that "effective October 1, 1994, the annual productive capacity (allowable harvest level) of the South Coast-Curry Master Units is 5.3 million cubic feet. This document meets the requirements for a Record of Decision as provided in 40 CFR 1505.2"

- Issue 7: An adequate economic analysis should be included in the EA.
- Resolution: A comprehensive economic analysis was included in the Coos Bay District RMP. Any economic analysis in this EA will be limited to what the ID Team and decision maker determine may be necessary to make a decision among the alternatives.
- Issue 8: Black stain root disease, *Leptograhium wagereri*, has been found in the general area and may spread in the proposed project area.
- Resolution: According to the supporting literature, and discussion with a plant pathologist/entomologist with USDA Forest Service's Southwest Oregon Forest Insect and Disease Technical Center, the risk of black stain root disease in the project area is low. This is due primarily to the fact that black stain disease occurs primarily in younger stands age 10-30 years old. The stands in this project are older than 30 years and generally beyond the age of susceptibility. However, some black stain disease is evident in some younger trees in and near the project area, mostly along roads. Any previously infected trees that are now snags will be retained as snags. Infected trees, within and adjacent to the project area, could be removed with this project or at a later date.
- Issue 9: The Nobletown and Line Creek fire ponds could be improved by cleaning logs and silt from the ponds. The Nobletown fire pond outlet culvert could be replaced due to some deterioration. The Line Creek pond could be converted from a pumper truck fill pond to a helicopter pond by cutting trees around the perimeter for ingress and egress of a helicopter.
- Resolution: These potential recommendations for improvement were discussed and subsequently dismissed by the ID Team. These improvements would cause unnecessary sedimentation to fish bearing streams, require road building around the ponds to clean them with an excavator, and increase stream temperatures on the Line Creek waterhole. The outlet culvert is rusty but is not expected to fail in the next 10 years and will be examined again in the future for possible replacement.

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## Chapter II - Alternatives

### No Action

Under this alternative, the project area would not be thinned or receive other treatments in the foreseeable future.

### Management Common to Action Alternatives

The items described below are common to Action Alternatives 1 (Proposed Action), 2 and 3. Items unique to each action alternative are described in the section for that alternative.

Thinning Prescription: The stands would be thinned by removing approximately 60 to 330 trees per acre leaving approximately 130-150 of the healthier stems per acre. From stand exam information the individual stands range from 210 to 468 stems per acre. Depending on the particular stand, approximately 5 to 13 Mbf per acre of the less thrifty conifer trees would be removed from the estimated standing volume which ranges from 24 to 46 thousand board feet (MBF) per acre. Hardwoods would not be marked for thinning.

The proposal to leave similar numbers of trees in the Riparian Reserves as in the Matrix is a conservative prescription that foregoes the most rapid attainment of late successional characteristics in favor of maintaining maximum connectivity function. This conservative approach would necessitate a second density management entry in the future to keep the Riparian Reserve stands on a trajectory to develop late-successional characteristics such as large trees and snags and diverse canopy levels.

Areas Excluded from Thinning: The areas described below would require protection by excluding them from the harvest area:

1. One hundred-fifty (150) foot stream buffer on the northwestern corner of unit 2 of the Deadhorse CT, where beaver activity is evident.
2. The wetland site identified in the southeast portion of the Beyers Way CT.
3. The stream area in the northern portion of the Beyer's Way CT, where thinning and yarding would not be permitted within 50 feet of the stream.
4. A 15 acre no treatment buffer established around the nest trees of a pair of Cooper's Hawks as identified by the Area biologist. No tree falling, yarding, or road construction/renovation would be allowed within 1/4 mile of the nest sites in the northern portion of the Beyers Way CT from March 1<sup>st</sup> through July 15<sup>th</sup>.
5. Three cultural sites in Beyer's Way CT project area, where thinning and yarding would be excluded to the extent identified by the District Archaeologist.
6. All S&M mollusks discovery sites within unit boundaries (approximately 140) will be buffered with a 50 foot radius reserve area and will be protected to the extent possible from logging disturbance.
7. Individual or clumped trees reserved for sensitive botanical species.

Tree falling: Conventional tree falling with chain saws would be used in cable harvest areas. A cut-to-length harvester would cut trees in ground based harvest areas. Trees in cable yarding corridors would need to be cut and removed to facilitate operating a cable yarding system. Trees would be required to be directionally felled into lead of cable yarding corridors. Trees would be required to be limbed, topped, and cut into log lengths not exceeding 40 feet prior to yarding. Trees felled for skyline cable corridors that are within 50 feet of perennial streams would be retained on site for coarse woody material (CWM).

No falling would be permitted March 1<sup>st</sup> through June 30<sup>th</sup>. In addition no falling would be permitted within 1/4 mile of the Cooper's Hawk nest trees on the Beyers Way CT from March 1<sup>st</sup> through July 15<sup>th</sup>.

Some small isolated black stain disease centers are evident in younger stands in and near the project area, mostly along roads. Any infected trees, and potentially infected neighboring trees, within and adjacent to the project area could be removed during or after the thinning. If necessary, a 50 foot radius of trees could be cut around infected trees to stop the spread to adjacent trees.

#### Yarding System Requirements:

##### Ground Based System:

- Equipment:** A cut-to-length mechanical harvester and forwarder would be required. The harvester reaches up to 35', cuts trees down, limbs, bucks, and decks logs on site. The forwarder loads and hauls logs to landing. The mechanical harvester travels on slash created by the harvester during log processing. The forwarder also travels on slash, and large capacity machines will minimize the number of trips that may compact soils (Kellogg 1997). Unlike crawler tractors or skidders, cut-to-length harvesters and forwarders do not have blades to move soil or organic material. The old existing skid trails would act as collector roads and have multiple passes as the primary travel path for the forwarders. Ground based equipment would not be permitted to travel through stream channels.
- Slope:** Generally, terrain < 35% would be designated as harvester/forwarder logging areas. These areas were previously harvested with crawler tractors.
- Season:** July 16 to onset of rainy season (approximately October 15<sup>th</sup>).  
In addition to the above, no yarding or loading would be permitted within 1/4 mile of the Cooper's Hawk nest trees on the Beyers Way CT from March 1<sup>st</sup> through July 15<sup>th</sup>.

##### Cable yarding system:

- Equipment:** A skyline cable system with 75 foot lateral yarding capability would be required to achieve one-end suspension. Intermediate supports may needed to achieve the desired one-end log suspension. Skyline corridors would be required to be a maximum of 12 feet wide. Distance between skyline corridors would be required to be a minimum of 150 apart at the tail hold where feasible.

- Slope: Generally, terrain > 35% or inaccessible to cut-to-length harvesters would be designated as skyline cable logging areas, however, it would be permissible to cable log the areas designated for harvester/forwarder logging.
- Season: July 1 to March 1 from existing rock and asphalt surfaced roads.  
July 1 to onset of rainy season (approximately October 15th) from dirt surfaced roads.  
In addition to the above, no yarding or loading would be permitted within 1/4 mile of the Cooper's Hawk nest trees on the Beyers Way CT from March 1<sup>st</sup> through July 15<sup>th</sup>.

#### Roads:

Access to units for log hauling would be from: existing asphalt mainline roads, existing rock surface secondary roads, existing driveable dirt spur roads needing renovation/improvement, existing undriveable dirt spur roads needing renovation/improvement, and construction of new spur roads and roadside landings. Some existing old tractor roads in flat terrain areas designated for harvester/forwarder harvesting system could be used by forwarders to bring logs to a landing area for loading onto log trucks.

Road renovation would consist of returning existing roads back to their original standard of construction. It could include clearing brush/trees, cleaning/replacing culverts, restoring proper drainage, and grading. Renovation would also include replacing deteriorated grade culverts on approximately 12 miles of two blacktop mainline haul roads, Burnt Ridge and Burnt Mt. Access Roads. No road renovation would be permitted within 1/4 mile of the Cooper's Hawk nest site on the Beyers Way CT from March 1<sup>st</sup> through July 15<sup>th</sup>.

Road improvement would consist of bringing a road up to the current standard for road construction. It could include, in addition to the renovation described above, some capital improvements such as adding needed culverts, and/or rocking existing dirt spurs. Surfaced roads would allow cable harvesting during the wet season. New road construction would consist of approximately 1.0 mile of semi-permanent dirt or rocked surface spur roads with landings, constructed on ridgetop locations. These semi-permanent roads would be fully decommissioned within a year after operations are completed. No new roads would be constructed in RRs. The dirt spurs would receive seasonal preventative maintenance prior to October 1 each year during non-hauling periods. This includes cross-ditching, removing ruts, and tank trapping.

After harvesting is completed all new constructed spur roads, landings, and renovated/improved old dirt spur roads under BLM control used for these sales, would be fully decommissioned. Waterbarring, ripping, pulling culverts, and seeding and mulching would be used as needed to reduce potential erosion and to restore the natural hydrologic flow. Fully decommissioned roads would also be tank trapped to prevent vehicle passage. The net reduction in road miles, due to fully decommissioning newly constructed spur roads and old dirt spurs, would be 0.8 miles. All fully decommissioned roads would be in the Tioga Creek key watershed.

The old existing skid trails used for forwarder yarding paths would be blocked to vehicle traffic near their junction with all weather roads. Tank traps would be constructed at the end of the dry season after the yarding paths are used.

#### Road Control of Haul Route

Beyer's Way CT	BLM controlled roads
Deadhorse CT	BLM controlled roads
Burnt Ridge	BLM controlled roads

#### Fire Suppression Waterholes

Access to the Line Creek waterhole in NE¼NW¼ of Section 10 and the Nobletown waterhole in SW¼NE¼ of Section 15 would be improved by cutting brush along the roads and improving/renovating the roads to the waterholes.



The following table summarizes the approximate length of new dirt or rocked surface spur road construction and road renovation/improvement for each sale unit. The table does not include culvert replacement on the blacktop roads.

<b><i>Sale Name</i></b>	<b><i>new road construction (miles)</i></b>	<b><i>road renovation/improvement* (miles)</i></b>	<b><i>full decommissioning (miles)</i></b>
Beyer's Way CT	0	2.0	0.0
Deadhorse CT - unit 1	0	1.0	0.0
- unit 2	0.4 (dirt)	1.0	0.8
- unit 3	0	0.6	0.0
Burnt Ridge CT	0.4 (rock) 0.2 (dirt)	2.0	1.2
<b><i>TOTAL</i></b>	<b><i>1.0 mile</i></b>	<b><i>6.6 miles</i></b>	<b><i>2.0 miles</i></b>

\* The table above does not include approximately 12 miles of ditch relief culvert replacement on the Burnt Ridge and Burnt Mt. Access Roads.

### ***Design Features and Management Requirements Common to Action Alternatives***

- C Landing, road construction and road renovation/improvement/decommissioning would be required in the dry season to reduce the chance of soil erosion or stream sedimentation.
- C Maintenance of the existing roads would be accomplished during the life of the sale to minimize road drainage problems and possible road failures. Bare soil areas from landing and road construction would be mulched and seeded with native plant species, if available, and fertilized. If native seed is unavailable, any bare road surfaces would be seeded with an approved District seed mix.
- C Roads will be brushed prior to any harvest or road construction activities to help prevent the spread of existing noxious weeds.
- C To prevent the introduction and spread of noxious weeds during the contract period, machinery and equipment will be washed prior to entering contract areas.
- C Existing snags would be retained on the units, with the exception of those that are deemed to be possible safety hazards during logging. Any snags felled or knocked over would be retained on site.
- C All existing down logs in Decay Classes 3, 4, and 5 would be reserved.
- C Partial log suspension would be required in cable logging areas. Full log suspension would be required across streams where physically possible. Lift trees and intermediate supports would be required to help attain desired log suspension.
- C The location, number, and width of cable yarding corridors would be specified prior to yarding, natural openings will be used as much as possible. Corridor width will be kept to a minimum.
- C Within safety standards, all trees would be directionally felled away from roads, posted boundaries, orange painted reserve trees, riparian areas, and snags.
- C Leave a reasonable buffer around the unimproved roadside hunting camps, in which no trees are cut, and no slash left. Keep access to the camps open.
- C Concentrated logging slash within 20 feet of roads and landings would be piled, covered with black plastic, and burned in winter when conditions meet State Smoke Management Regulations.

- C Monitoring would be accomplished in the form of: road construction and renovation inspections; logging inspections; and noxious weed monitoring.
- C A standard special provision would be included in the contract to require compliance with applicable Oregon State Fire Laws. Disposal of slash through various burning methods requires compliance with the Oregon Smoke Management Plan.
- C The timber sale contract would require appropriate provisions for the disposal of wastes and handling of hazardous materials. State of Oregon Department of Environmental Quality (DEQ) and Forest Practices guidelines for spill prevention and containment will apply to any sale contracts resulting from this EA. Site monitoring for solid and hazardous waste will be performed during the performance of this work in conjunction with normal contract administration. Any spills or releases resulting from operations shall be subject to the District Spill Plan. Post-harvest road closures will reduce the potential sites for illegal dumping.
- C If Threatened and Endangered (T&E), Survey and Manage (S&M), Special Status, or Protection Buffer plant, animal or fish species are found in the sale units, management guidelines for the species will be implemented. Timber sale contracts will include a standard T&E species stipulation (special provision E-4).
- C Consultation with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) will be required before advertisement of the sales.
- C Native American Grave Protection and Repatriation Act (43 CFR Part 10; IM OR-97-052) Notification Requirements will be followed.
- C If any important cultural materials are encountered during the project, all work in the vicinity will stop and the District Archaeologist will be notified at once.

**Alternative 1 (Proposed Action)- Thin the GFMA and the Riparian Reserve**

Except for the excluded areas described earlier and a strip approximately 25 feet each side of streams, the GFMA and RR would be thinned using the same prescription described above in "Management Common to Action Alternatives".

The table below for Alternative 1 shows the estimated harvest acres, harvest volumes, and snag treated acres in GFMA and Riparian Reserve areas.

Sale name - Unit No.	Est. Project Area Acres	Project Area GFMA Acres and RR Acres	Acres to thin in GFMA	Acres to thin in RR	Total Acres to thin	Est. GFMA Mbf	Est. RR Mbf	Est. Total Mbf	Est. Acres in GFMA to create snags	Est. Acres in RR to create snags
Beyer's Way CT	331	GFMA = 152 RR = 179	152	152	304	1231	1231	2462	0	0
Deadhorse CT-1	70	GFMA = 18 RR = 52	18	46	64	169	432	601	0	0
Deadhorse CT-2	50	GFMA = 14 RR = 36	14	29	43	140	290	430	0	0
Deadhorse CT-3	24	GFMA = 14 RR = 10	14	7	21	70	35	105	0	0
Burnt Ridge CT	304	GFMA = 100 RR = 204	100	164	264	950	1558	2508	0	0
<b>TOTAL</b>	<b>779</b>	<b>GFMA = 298 RR = 481</b>	<b>298</b>	<b>398</b>	<b>696</b>	<b>2560</b>	<b>3546</b>	<b>6106</b>	<b>0</b>	<b>0</b>

Under Alternative 1 it is estimated that approximately 83 acres of RR would not be thinned. These acres are in addition to the areas excluded from thinning as described above in "Management Common to Action Alternatives.

The table below shows the estimated acres for each harvest system under Alternative 1:

Sale name -unit	Total Harvest Acres	Cut-to-length/forwarder*	Skyline cable
Beyer's Way CT	304	290	14
Deadhorse CT -1	64	64	0
Deadhorse CT - 2	43	5	38
Deadhorse CT - 3	21	21	0
Burnt Ridge CT	264	76	188
<b>TOTAL</b>	<b>696</b>	<b>456</b>	<b>240</b>

\* A skyline cable system could be optional and permitted in some areas identified for a cut-to-length harvest system during the wet season.

**Alternative 2 - Thinning of the GFMA; no thinning of Riparian Reserve:**

This alternative is similar to Alternative 1, except only the GFMA would be thinned; the riparian reserve area would not be thinned.

The table below for Alternative 2 shows the estimated harvest acres, harvest volumes, and snag treated acres in GFMA and Riparian Reserve areas.

Sale name - Unit No.	Est. Project Area Acres	Project Area GFMA Acres and RR Acres	Acres to thin in GFMA	Acres to thin in RR	Total Acres to thin	Est. GFMA Mbf	Est. RR Mbf	Est. Total Mbf	Est. Acres in GFMA to create snags	Est. Acres in RR to create snags
Beyer's Way CT	331	GFMA = 152 RR = 179	152	0	152	1231	0	1231	0	0
Deadhorse CT-1	70	GFMA =18 RR = 52	18	0	18	169	0	169	0	0
Deadhorse CT-2	50	GFMA = 14 RR = 36	14	0	14	140	0	140	0	0
Deadhorse CT-3	24	GFMA =14 RR = 10	14	0	14	70	0	70	0	0
Burnt Ridge CT	304	GFMA = 100 RR =204	100	0	100	950	0	950	0	0
<b>TOTAL</b>	<b>779</b>	<b>GFMA = 298 RR = 481</b>	<b>298</b>	<b>0</b>	<b>298</b>	<b>2560</b>	<b>0</b>	<b>2560</b>	<b>0</b>	<b>0</b>

Under Alternative 2 it is estimated that approximately 481 acres of RR would not be thinned. These acres are in addition to the areas excluded from thinning as described above in "Management Common to Action Alternatives.

The table below shows the estimated acres for each harvest system under Alternative 2:

Sale name -unit	Total Harvest Acres	Cut-to-length harvester/forwarder*	Skyline cable
Beyer's Way CT	152	138	14
Deadhorse CT -1	18	18	0
Deadhorse CT - 2	14	7	7
Deadhorse CT - 3	14	14	0
Burnt Ridge CT	100	71	29
<b>TOTAL</b>	<b>298</b>	<b>248</b>	<b>50</b>

\* A skyline cable system could be optional and permitted in some areas identified for a cut-to-length harvest system during the wet season.

**Alternative 3 - Thinning of the GFMA; thinning of the upland perimeter of the RR ;  
snag creation throughout entire proposed project area**

Same as Alternative 2, except a portion of the upland perimeter area (approximately 60 feet wide) of the RRs would be included in the thinning area in addition to thinning the GFMA. Throughout the entire project area (GFMA & RR's), except those areas listed above under "Excluded Areas", 2 trees per acre would be topped at 50+ feet using a chainsaw to create additional class 1 snags. The minimum size for topped trees would be 15" dbh.

The table below for Alternative 3 shows the estimated harvest acres, harvest volumes, and snag treated acres in GFMA and Riparian Reserve areas.

Sale name - Unit No.	Est. Project Area Acres	Project Area GFMA Acres and RR Acres	Acres to thin in GFMA	Acres to thin RR	Total Acres to thin	Est. GFMA Mbf	Est. RR Mbf	Est. Total Mbf	Est. Acres in GFMA to create snags	Est. Acres in RR to create snags
Beyer's Way CT	331	GFMA = 152 RR = 179	152	54	206	1231	437	1668	152	179
Deadhorse CT-1	70	GFMA = 18 RR = 52	18	16	34	169	150	319	18	52
Deadhorse CT-2	50	GFMA = 14 RR = 36	14	11	25	140	110	250	14	36
Deadhorse CT-3	24	GFMA = 14 RR = 10	14	3	17	70	15	85	14	10
Burnt Ridge CT	304	GFMA = 100 RR = 204	100	61	161	950	580	1530	100	204
<b>TOTAL</b>	<b>779</b>	GFMA = <b>298</b> RR = <b>481</b>	<b>298</b>	<b>145</b>	<b>443</b>	<b>2560</b>	<b>1292</b>	<b>3852</b>	<b>298</b>	<b>481</b>

Under Alternative 3 it is estimated that approximately 336 acres of RR would not be thinned. These acres are in addition to the areas excluded from thinning as described above in "Management Common to Action Alternatives."

The table below shows the estimated acres for each harvest system under Alternative 3:

Sale name -unit	Total Harvest Acres	Cut-to-length/forwarder*	Skyline cable
Beyer's Way CT	206	194	12
Deadhorse CT -1	34	34	0
Deadhorse CT - 2	25	20	5
Deadhorse CT - 3	17	17	0
Burnt Ridge CT	161	95	66
<b>TOTAL</b>	<b>443</b>	<b>360</b>	<b>83</b>

\* A skyline cable system could be optional and permitted in some areas identified for a cut-to-length harvest system during the wet season.

***Comparison of Treatments among Alternatives:***

	<b><i>No action</i></b>	<b><i>Alt. 1</i></b>	<b><i>Alt. 2</i></b>	<b><i>Alt. 3</i></b>
Acres to thin in GFMA	0	298 (38%)	298 (38%)	298 (38%)
Acres to thin in RR	0	398 (51%)	0	145 (19%)
SUBTOTAL: Total Acres to thin	0	696	298	443
Acres excluded from thinning	779 (100%)	83 (11%)	481(62%)	336 (43%)
TOTAL: Total Project Area Acres	779 (100%)	779 (100%)	779 (100%)	779 (100%)
Acres in GFMA to create additional snags	0	0	0	298
Acres in RR to create additional snags	0	0	0	481
Estimated timber harvest volume (MBF)	0	6106	2560	3852

***Alternative Considered but Rejected***

Thinning in GFMA, Thinning in Riparian Reserve with no removal of cut trees:

Depending on the particular stand, approximately 5 to 13 Mbf per acre of the less thrifty conifer trees would be cut as proposed in Alternative No. 1. The cut trees in the riparian reserves would not be removed, but rather left on site as a source of CWM. This alternative was rejected because leaving that amount of CWM on the ground would create a short term fire hazard, would increase the risk of insect infestations, would suppress understory vegetative growth, and is inconsistent with the O&C Act. Another reason for rejecting this alternative is that leaving the cut logs in the Riparian Reserves would not be economically viable.

### Chapter III - Affected Environment

#### Physical and Geographic Characteristics

The project area is located approximately 12 air miles northwest of Tenmile, Oregon in the Pacific Coast Range. The legal description is T. 27 S., R. 9 W., Sections 10, 14, 15, 22, 23, and 24, Willamette Meridian. The proposed treatment areas are located primarily in the Tioga Creek subwatershed, with a small percentage in the Cedar Creek, and Panther Creek subwatersheds. The elevation of the units range from 2300 to 2900 feet. The topographic aspect is predominantly north and west. The steepness varies from a gentle bench in the Beyers Way CT project to steep in the Burnt Ridge CT project area. Slopes range from 0 to 80 percent.

#### Soils

The Tioga Creek thinnings are located in the Coast Range physiographical province. The geological materials associated with the soils of the area are developed from the Tyee Formation. The Tyee Formation is composed of rhythmically bedded sandstone and siltstone. The Tyee tends to have high ground water in some areas, rapid runoff, steep slopes, and sharply alternating beds of sandstone and softer siltstones. The potential for slumps, debris and earth flows are intensified by these characteristics. Roads are the most affected by these types of slope failures.

Specific soil data can be obtained from the Soil Survey of Coos County, Oregon, 1989, and the February 1994 Douglas County Area, Oregon Soil Inventory. Additional soil information can be found in the EA analysis file. The following table lists the proposed thinnings with their associated soil types.

Sale Name	Mapping Unit (% of Unit)	Soil Type	% Slope of soil type
Beyers Way CT	46F (5%) 38F (10%) 50D (15%) 46D (70%)	Preacher-Bohannon Loams Milbury-Bohannon-Umpcoos Association Remote-Digger-Preacher Complex Preacher-Bohannon Loams	60% - 90% 12% - 30% 12% - 30% 3% - 30%
Deadhorse CT Unit #1	46D	Preacher-Bohannon Loams	3% - 30%
Unit #2	46F (80%) 46D (20%)	Preacher-Bohannon Loams Preacher-Bohannon Loams	60% - 90% 3% - 30%
Unit #3	46D	Preacher-Bohannon Loams	3% - 30%
Burnt Ridge CT	46D (20%) 46E (20%) 46F (60%)	Preacher-Bohannon Loams Preacher-Bohannon Loams Preacher-Bohannon Loams	3% - 30% 30% - 60% 60% - 90%

Timber Production Capability Classifications (TPCC) identifies potential soil and reforestation problems. The proposed treatment units are summarized in the table below:

Sale name -unit	TPCC and percentage of each classification
Beyer's Way CT	RPR (100%)
Deadhorse CT -1	FGR1 (10%), RPR (100%), RLR (30%)
Deadhorse CT - 2	FGR1 (100%), RPR (100%)
Deadhorse CT - 3	FGR1 (30%), RPR (100%), RLR (70%)
Burnt Ridge CT	FGR1 (75%), RPR (100%)

Explanation for the TPCC above:

FGR1: Fragile soils due to gradient (moderately steep slopes)

RLR: Reforestation problem due to poor light (brush & hardwood competition)

RPR: Reforestation problem due to disease (blackstain pockets)

### ***Vegetation, Including Sensitive Species***

Overstory: The overstory trees are a result of managed stands established after timber harvest and consist primarily of Douglas-fir and secondarily of Western hemlock. The percentage of hemlock ranges from 9% to 47% in the stands inventoried. The stand ages are approximately 35-50 years old and were established either by planting, aerial seeding, natural regeneration or a combination of these. Other tree species occasionally found mixed in the stand are: western redcedar, red alder, golden chinquapin, and bigleaf maple. Tree diameters average approximately 12 inches in diameter breast height (DBH). The Beyer's Way CT was surveyed for snags and found to have approximately 13 snags per acre averaging 13.6 inches DBH. Many of the snags are in the smaller diameter classes resulting from suppression mortality. The Deadhorse CT and Burnt Ridge CT were not sampled. Most of these stands have been intensively managed for timber production and have received silvicultural treatments such as pre-commercial thinning, brush control, and fertilization to enhance growth and vigor.

Stand Exams: The table below shows stand information based on data from stand exams of the proposed project area:

	Range of Stand Birth dates	Average Trees/ac.	Average DBH	Range of standing Mbf/acre	Range of Mbf to remove per acre
Beyer's Way CT	1950 to 1966	259	12"	22 - 35	5 - 9
Deadhorse CT - 1	1960 to 1965	424	11"	29 - 30	8 - 10
Deadhorse CT - 2	1960	302	10"	32	10
Deadhorse CT - 3	1950	201	12"	26	5
Burnt Ridge CT	1950 to 1966	245	13"	38 - 46	8 - 13

Port-Orford-Cedar and Pacific Yew: From stand exam information and timber cruise data, no Port-Orford cedar is known to occur in or near this project area. There is no indication of Port-Orford cedar and its associated root disease, *Phytophthora lateralis* along any of the roads leading to the individual units. No Pacific yew is known to occur on any of the units, but it is possible there could be individuals in the project area. However, Pacific yew mortality from *Phytophthora lateralis* is known to occur only in areas where there is infected Port-Orford cedar.

Understory: Understory species consist of rhododendron, huckleberry, sword fern, salal, and Oregon grape.

Sensitive Plants: Prior to surveying these proposed sales there were no known locations of Survey and Manage Strategy 1 species. The project area was recently surveyed for bryophytes, fungi, lichens, and vascular plants. Areas considered special habitat were excluded from the original project area (described earlier under "Management Common to Action Alternative"). S&M Strategy 2 and Protection buffer species sites located within the project area were protected by orange marking reserve trees adjacent to these sites. (The Botanist's report is in the Analysis File).

The proposed project area has known potential habitat and/or populations of unsurveyed species covered under the October 1998 EA to Change the Implementation Schedule for Survey and Manage and Protection Buffer Species.

Noxious weeds: The Tioga Creek subwatershed is known to contain gorse, scotch broom, french broom, common St. Johnswart/Klamath weed, and tansy ragwort. The known gorse sites are near the Deadhorse CT

and within 2 miles of the Beyer's Way CT. Scotch broom is established throughout the subwatershed but is mostly located along the Burnt Ridge Road system with a few plants on the gravel roads. There are no identified french broom or Klamath weed within the project area. Tansy is also found on open ground throughout the subwatershed and currently being controlled by biological agents. (The Noxious Weed Coordinator's report is in the Analysis File).

### ***Aquatic Habitat/Fisheries, Including T & E Species***

#### Special Status Species

There are no known "special status" fishes present within the boundaries of Beyers Way, Deadhorse or Burnt Ridge commercial thinning units. Streams within these units, however, do flow directly into streams containing special status fishes in their lower reaches below longstanding, naturally impassable barriers.

Oregon coast coho salmon is currently listed as "threatened" and is found in Tioga Creek. Coastal cutthroat trout and Oregon coast steelhead trout, both "candidate" species currently under review for listing by the National Marine Fisheries Service, also reside in Tioga Creek. Coho salmon and steelhead trout have been "assisted" above previously impassable barriers on lower Tioga Creek with ladders in the 1960's. Their present upstream limit on Tioga Creek is approximately 2 miles below these sale units. Coastal cutthroat trout are found throughout the main stem Tioga Creek to the headwaters as well as some tributaries. Their most upstream known occupied habitat is at least 1 mile below these sales. Natural barriers prevent cutthroat trout from accessing streams within the boundaries of these units.

Gooseberry Gulch and Bear gulch, tributaries of the Williams River, contain listed Coastal coho salmon and candidate Coastal steelhead and Coastal cutthroat trout in the lower reaches several miles below these sales. Two other "Species of Concern," the Pacific lamprey and the Millicoma dace, are found in downstream reaches of Tioga Creek and Williams River.

#### Fisheries Habitat

##### Beyers Way Commercial Thinning (1 Unit)

This sale consists of one 331 acre unit on relatively flat ridgetop terrain. It is located on Burnt Ridge which is the divide between upper Tioga Creek and tributaries of the Williams River. Most of this unit is in the Matrix portion of the upper one third of the Tioga Creek Subwatershed. The remainder of the acres fall east of the ridge and are in the Gooseberry Gulch portion of the Cedar Creek Subwatershed in the South Coos River 5<sup>th</sup> field watershed.

This sale unit sits on a flat capstone-like ridge top in the Tye Formation. Small perennial, intermittent, and ephemeral streams originate in this unit and flow to the west into Tioga Creek, dropping nearly vertically off this flat ridge. As these streams flow to Tioga Creek they drop over several waterfalls up to 50-feet in height. These waterfalls have formed through the uneven erosion at the edge of this ridge top Tye sandstone. Other falls are further down Tioga Creek and have historically blocked the upstream migration of anadromous and resident fish. Streams that flow to the Williams River also drop off the ridge into waterfall barriers. For this reason there are no fish found in streams within the unit boundaries.

Three small un-named perennial streams start from within the boundaries of this sale unit. Several short un-named intermittent and ephemeral streams also originate in the unit. Flatter portions of the unit have some overland flow without channel formation. No fish were found in any of these streams. These small perennial streams flow into streams bearing resident cutthroat trout within one mile of leaving the unit boundary. This unit is approximately 2 miles above the upstream most extent of coho salmon access on Tioga Creek and approximately 1 mile above the upper limits of steelhead trout. Streams are well shaded due to the dense conifer over-story. They currently contribute cold, high quality water to the downstream fishery. They also contain a good diversity of aquatic macro-invertebrates and larval salamanders. Large woody material in the channels of perennial streams is sparsely distributed.

Older air photos reveal much about the past land management of the area. Much of the timber was originally harvested by means of ground based heavy equipment. The area is covered by an extensive network of "skid" trails. Many portions of stream channels and riparian zones were used as trails to access and remove timber. Flow patterns and stream channel integrity of some streams have been



altered by these actions. Stream channels, as well as their riparian zones, were impacted by this equipment and harvest method.

During historical periods of timber harvest, low value and fire damaged logs were left on site. Many of these logs were scattered across the landscape as individual logs or were placed into piles. The log piles or individual logs that were left in channels and riparian zones contribute most of the large channel structure and helps maintain aquatic and channel functions. A few of these logs are in decay class 3, however most are in classes 4 and 5. Most of these logs exceed 45-inches in diameter. Growing trees to replace logs of this large size as downed CWM can take hundreds of years. The current stand of trees, with only a pre-commercial thinning treatment, may not be capable of providing a 24-inch or greater log to the channel or Riparian Reserve for another 70 to 130 years unless the stocking levels of existing stands are reduced. These class 4 and 5 logs are very beneficial to stream channels. They can act as sponges, soaking up and holding rain water which helps to maintain a cool, moist, micro-climate in the stream channel well into the dry season. These logs also slowly contribute nutrients to the soil and stream system. Natural suppressed tree mortality within the riparian reserve is not contributing downed logs of sufficient size to replace the existing CWM.

#### Deadhorse Commercial Thinning (3 Units)

This sale consists of three units on Burnt Ridge approximately one mile to the southeast of the Beyers Way commercial thinning site. Two of these units are in the Tioga Creek subwatershed at the head of a fish bearing stream locally known as Wilson Folly Creek, and the third unit is in the headwater of Bear Gulch in the Panther Creek subwatershed in the South Coos River 5<sup>th</sup> field watershed.

Four small un-named perennial streams originate from within the boundaries or flow along the edge of these units. Several short un-named intermittent and ephemeral streams can also be found in the units. No fish were found in any of these streams. These streams however, do flow into fish bearing streams within one mile of leaving the unit boundaries. These streams are well shaded by dense conifer over-story. They currently contribute cool, high quality water to the downstream fishery. They also contain a good diversity of aquatic macro-invertebrates and larval salamanders.

The small un-named stream on the north edge of unit #2 has an extensive network of beaver dams that have active beaver use. This beaver dam network provides a stable wet meadow habitat providing water storage for low flow period release to downstream fish bearing waters.

An unnamed stream in the west end of unit 2 has been severely altered by past forest management activities (roads). An old skid trail runs through the spring source of this creek and has resulted in bank erosion and loss of channel stability. A portion of the lower stream channel flows subsurface. This stream is well shaded and because a portion of it flows under ground it provides high quality cold water to downstream reaches.

Older air photos reveal marks of past land management of the area. Where the terrain allowed, timber was originally harvested by means of ground based heavy equipment and these units contain several old "skid" trails. Evidence suggests that portions of stream channels or riparian zones were used as trails to access and remove timber. Stream channels, as well as their riparian zones, were impacted by these harvest methods. Roads/trails that crossed streams altered hydrologic flow patterns and channel functions for short reaches.

During the historical periods of harvest, low value and fire damaged logs were left on site. Many of these logs were scattered or were placed in large piles across the landscape. Those log piles or other individual logs that were left in streams and riparian zones contribute most of the large channel structure found today. These logs are presently in decay classes 4 and 5. Most of these logs exceed 45-inches in diameter. Growing trees to replace logs of this large size as CWM can take hundreds of years. The current stand of trees, with only a pre-commercial thinning treatment may not be capable of providing a 24-inch or greater log to the channel or Riparian Reserve for another 70 to 130 years unless the stocking levels of existing stands are reduced. These logs, as class 4's and 5's, can act as sponges, soaking up and holding rain water which helps to maintain a cool, moist, micro-climate in the stream channel well into the dry season. They also contribute nutrients to the soil and stream system. Mortality from

suppressed trees within the riparian reserves is not contributing downed logs of sufficient size to replace this existing CWM.

#### Burnt Ridge Commercial Thinning (1 Unit)

This sale consists of one 304 acre unit on Burnt Ridge approximately one-half mile north of Beyers Way commercial thinning. This unit lies almost entirely in the Tioga Creek Subwatershed, except for a few acres that are on and over the ridge into the Gooseberry Gulch portion of the Cedar Creek Subwatershed.

Three un-named 3<sup>rd</sup> order perennial streams originate from within the boundaries of this sale unit. Two are tributaries to Tioga Creek and one is a tributary to Burnt Creek, a drainage of Tioga Creek. Several short un-named ephemeral tributary streams are also present in the unit.

A small perennial stream, locally known as Line Creek, originates in the north part of the unit and contains resident cutthroat trout, a candidate species, just below the unit boundary at the northwest corner the unit. A passage barrier caused by the culvert that crosses the Burnt Ridge Road (No. 25-09-31.0) prevents upstream movement. This stream is a tributary of Burnt Creek. Line Creek tanker waterhole is just above this culvert. The outlet of this waterhole is also a barrier to upstream fish passage. No fish were found above the waterhole even though about 0.5 - .75 miles of suitable in-stream habitat exists.

The other two perennial streams in the unit flow into a fish bearing tributary of Tioga Creek less than one-half mile below the unit boundary. Longstanding natural barriers prevent fish from migrating into these perennial streams from Tioga Creek populations. The stream in the southern part of the unit has unstable streambanks and loose soils susceptible to erosion.

These streams are well shaded due to the dense conifer over-story. They currently contribute cool, high quality water to the downstream fishery. They also contain a good diversity of aquatic macro-invertebrates. However, they currently lack the quantity and quality of CWM that contributes to a proper functioning stream channel.

Older air photos reveal much about the past land management of the area. Because of the steeper terrain in this unit fewer cat/skid trails exist, however, some reaches of stream channels and riparian zones that were used as trails to access and remove timber have been impacted.

As with the other units in this project, many logs were placed in large piles across the landscape. Fewer logs were left in stream channels of this unit than in the others. The logs that were left in streams and riparian zones contribute most of the large structure in the stream channels. Most of these logs exceed 45-inches in diameter. Growing trees to replace logs of this large size as CWM can take hundreds of years. The current stand of trees, with only a pre-commercial thinning treatment, may not be capable of providing a 24-inch or greater log to stream channels or Riparian Reserve for another 70 to 130 years unless the stocking levels of existing stands are reduced. The existing class 4 and 5 logs are very beneficial to stream channels. They can act as sponges, soaking up and holding rain water which helps to maintain a cool, moist, micro-climate in the stream channel well into the dry season. These logs also slowly contribute nutrients to the soil and stream system. Natural suppressed tree mortality within the riparian reserve is not contributing replacement downed logs of sufficient size to replace the existing CWM.

#### Line Creek Waterhole:

This fire pond is located on an unnamed tributary of Burnt Creek and is within the Tioga Creek Subwatershed which is a Tier 1 Key Watershed. This pond is within the Riparian Reserve of the resident cutthroat trout bearing reach of this stream. Cutthroat trout are found in this creek up to the culvert. It is suspected that trout had access and inhabited the creek above the pond prior to pond construction.

The pond outflow is from a pipe in the dam and is drawn from the surface of the pond. Creek flow into the pond is very low in the summer. In the summer, as more sunlight reaches the surface of this pond, water temperatures are likely to be elevated, warming the fish bearing creek below. Another fire pond on

this creek, approximately 1 mile downstream, also releases water from the surface adding cumulative warming impacts to aquatic and fishery habitat.

#### Nobletown Waterhole:

This pond is above a natural barrier on a non-fish bearing reach of an unnamed tributary to Tioga Creek. This stream is perennial below the pond. Resident cutthroat trout are found in this stream approximately ½-mile downstream from the pond. Surface flow is released from the pond and temperatures may be slightly elevated during summertime releases. (The Fisheries Biologist report is in the Analysis File).

### **Wildlife Species & Habitats**

The stands proposed for treatment are second growth plantations, ranging from 35-50 years of age, with an average overstory tree diameter from 10-13" DBH. The Tioga Creek Watershed Analysis (USDI 1996) provides a general description of wildlife species and habitat conditions found within these timber sale areas and the surrounding subwatershed. Additional site specific key habitat features, wildlife species of concern and documented wildlife sites identified within the proposed sale units during field reviews are provided below.

#### Coarse Woody Material

Large decay class 3, 4, & 5 down logs left as cull material during the previous harvest are abundant throughout the Beyers Way and Burnt Ridge timber sales, and in unit 3 of the Deadhorse timber sale, while they are present in low to moderate levels in Deadhorse units 1 & 2. Although pre-harvest surveys have not been completed, most logs range from 36-60" in diameter. Most of these logs were severely charred during prescribed burning prior to planting. Due to their advanced state of decay, most of these logs would be easily damaged if driven over or moved by ground based harvesting equipment. Very few large decay class 1 & 2 logs are present in any of the units, although several small patches of wind thrown trees were found in the east portion of Deadhorse unit #1 and various locations in Burnt Ridge. Most class 1 & 2 logs are less than 12" in diameter, created in recent years by suppression mortality.

#### Special Habitats

##### Beyers Way

A wet meadow encompassing two seasonal ponds was found near the eastern edge of the proposed sale. This meadow is dominated by a combination of grass, sedge, and forbs with pockets of willow and small shrubs. The origin of this meadow is not clear, but review of the aerial photos shows the effects of cat logging in the 1950's and again in the 1970's has definitely altered the original drainage patterns. The two seasonal ponds currently provide breeding habitat for Pacific tree frogs, and likely Northwestern salamanders. These ponds may also provide a valuable water source and foraging site for forest bat species.

In the northwestern portion of this sale unit a small, shallow pond was found at the junction of two 1<sup>st</sup> order draws. This pond contained hundreds of Northwestern salamander larvae and several unhatched egg masses, obviously providing important habitat for this species and likely other amphibians.

##### Burnt Ridge

No special habitats were identified in the Burnt Ridge sale area.

##### Deadhorse

A number of active beaver dams are present along approximately a mile of the 2<sup>nd</sup> order stream which borders the north side of unit 2. Beaver are actively cutting small hardwood and conifer trees to establish and maintain dams. Evidence of old cuttings indicate beaver have used this site intermittently for at least 10-15 years.

A small spring is located in the southwest portion of unit 2. This spring provides water to an intermittent/perennial stream which flows north to an area just above the 27-09-26.0 road where the stream goes subsurface for several hundred yards. The subsurface flow of this stream appears to be caused by the dumping of wood, debris, and fill material in this draw during road construction and past logging activities.

## Vegetative and Structural Habitat Complexity

### Beyers Way

The proposed sale area averages 259 trees per acre, with the average overstory tree size 12" DBH, but actual tree sizes and density vary quite a bit. The overstory is predominantly Douglas-fir and hemlock, with few western redcedar and almost no hardwoods present. Slower growth is occurring in all trees and suppression mortality is beginning to occur in the intermediate and suppressed trees. Understory shrubs are present in light to moderate amounts in scattered patches, dominated by rhododendron, sword fern, and Oregon grape.

### Burnt Ridge

The proposed sale area averages 245 trees per acre, with the average overstory tree size 13" DBH, but tree sizes and density vary quite a bit. The overstory is predominantly single layered Douglas-fir, with some western hemlock and a few western redcedar. There is an occasional stringer of red alder along some small portions of the streams. Larger trees up to 16" DBH are more common in this sale than in the other sale areas. Suppression mortality and slower growth is beginning to occur, particularly in the intermediate and suppressed trees. Understory shrubs are present in scattered patches, dominated by salal and vine maple.

### Deadhorse

The proposed sale units average from 201-424 trees per acre, with the average overstory tree sizes ranging from 10-12" DBH. The overstory is predominantly Douglas-fir and western hemlock, with a few scattered patches of hardwoods in the upper portions of unit 1. Due to the higher densities, tree size and spacing units 1 & 2 appear more uniform, and the pattern of individual tree dominance is not as well established as in other sale units. These stands currently support single overstory canopies (as is typical of mid-seral coastal forests). Understory shrubs are present in light to moderate amounts in scattered patches, dominated by rhododendron, vine maple, sword fern, and Oregon grape.

## Riparian Reserves

The long term timber management plan, when these stands were planted, was for short harvest rotations of 40 - 80 years depending on the management plan in effect at the time. Managing for maximum yield was a consistent objective for the life of these stands before the NWFP mandated Riparian Reserves. Obtaining maximum yields meant keeping site fully occupied with commercial tree species, thus perpetuating uniform single story stand conditions. The practice of leaving buffer strips between streams and clearcut units did not begin until the late 1960's and the concept of leaving intact buffer strips in regeneration harvest units was not regularly applied until the late 1970's. Consequently, the original streamside stands in the project area were logged and the second growth stands were set on an intensive management trajectory.

The entire 779 acres of the proposed harvest units were set on a trajectory for maximum volume production through single species planting with a high density and even spacing. This resulted in a closed canopy and single story which limited the development of understory vegetation by quickly dominating the site. This habitat has little value except to mid-seral wildlife species. Late-seral species may be present for a short period as "legacy" features, such as coarse wood material, retain habitat features from the previous old growth conditions. These stands have been managed for a final harvest at approximately 40-60 years old. As these stands exceed this age without manipulation, their annual growth rate will decline, and their risk of blowdown increases due to a decline in their relative root mass, and decline in their diameter to height ratio (Oliver; Larson 1990). Suppression mortality kills the smaller trees in the stand and will provide snags and down wood, but it will be small in size and will last a relatively short time. Few large trees die because of competition (Peet; Christensen 1987). Instead, insect, disease, mechanical, or weather related injury or disturbance cause most mortality among large trees. High stand densities would delay attainment of large diameter trees and consequently also delay attainment of large diameter down wood and snags. Stand projection simulations suggest it will take an unthinned stand 200 years to regularly produce large diameter forest structure associated with late-seral stands (USDI 1999). In contrast, Tappeiner *et al.* (1997) found that many Coast Range old growth stands developed under low stocking densities and developed large diameter trees capable of providing large structure by the time those trees were 50-years old.

Barring windthrow or other such catastrophic events, the trees will have short crowns and small diameters relative to their heights, small length and diameter branch size, and low root mass to crown production. Limited understory regeneration will occur and will be confined to open patches and edges. The understory vegetation, including trees that do establish, will not be vigorous and will have little to no growth. The understory trees will have a flat-topped growth form (Oliver and Larson 1990).

#### Roads

An extensive network of skid roads and trails were created during previous timber harvest activities in all sale areas. Most of these roads are no longer in use, but many of the compacted road beds remain relatively unvegetated. In some places this network has substantially changed the natural drainage patterns. Water has been diverted from natural stream channels to flow down the existing road surfaces, and in several cases perennial stream channels have been filled with debris possibly causing streams to become subsurface for 1500 feet or more. Additionally, on the northern edge of the Burnt Ridge sale area, past activities have diverted a small stream from the stream channel into an old skid road surface.

#### Wildlife Species of Concern

##### Threatened and Endangered Species

There are no known threatened or endangered species nest sites or activity centers within the proposed sale areas or the immediate vicinity. Due to the relatively young age of the stands, and the lack of large rivers or cliff sites, there is no suitable habitat for bald eagles or peregrine falcons in the proposed sale units. There are a number of stands containing suitable marbled murrelet habitat within 0.25 miles of the Beyers Way and Deadhorse sale units, but all of these stands have been previously surveyed for murrelets and been documented as unoccupied. Due to the lack of suitable habitat or proximity of known activity centers, the proposed thinning should not affect any threatened or endangered species. Therefore, no further analysis of this species will be included for this EA.

##### Survey and Manage Species

##### Red Tree Vole

The procedures outlined in the *Interim Guidance for Survey and Manage Component 2: Red Tree Vole* (USDA 1997) were used to evaluate the need for site specific surveys of the proposed Tioga Creek CT's (See Table below). These sales are located in the South Fork Coos analytical watershed. The BLM administers more than 10% of the lands within this watershed (Screen #1). An analysis of potential red tree vole habitat was completed using the existing information in the Forest Operations Inventory database. This data shows that currently this watershed provides substantially more than the minimum required 40% of suitable red tree vole habitat on federal lands (Screen #2). Therefore, no site-specific red tree vole surveys of the proposed timber sale units are required, and no further analysis of this species will be included for this EA.

Watershed	Total Acres	Federal Acres	% Federal Ownership (Screen #1)	Federal Acres Suitable	% Federal Suitable (Screen #2)
South Coos	160,386	31,837	20%	17,142	54%

##### Del Norte Salamander

Although the proposed sale units are located approximately 20 miles north of the furthest known Del Norte salamander site, and considered outside of the known range limits for this species, habitat surveys of the proposed timber sale units were conducted to ensure the species was not likely to inhabit the site. Although a few areas of exposed rock were located in and adjacent to the Beyers Way timber sale, this rock was not suitable Del Norte salamander habitat. Instead of deep talus typical of quality habitat, most of the surface rock in this sale area was composed of very large rocks 16"-36" diameter exposed during past road construction activities, or smaller rock imbedded in the soil. Additionally, these rock habitat areas are isolated by large areas of deep forest soils which do not contain any surface rock. Due to the lack of suitable habitat, extensive time constrained searches were not conducted. No further analysis of this species will be included for this EA.

#### Mollusks

S&M mollusk species Prophysaon coeruleum, Prophysaon dubium, and Megomphix hemphilli were searched for using protocol surveys. Approximately 140 occupied sites were found within the marked unit boundaries. Only Prophysaon coeruleum and Prophysaon dubium were present. Megomphix hemphilli was not found. The sites were usually associated with residual decay classes 4 and 5 CWM that was left from previous timber harvest. The majority (53%) of Survey and Manage mollusks were found in log piles within Riparian Reserves, but were located across all landscape features (riparian to uplands). Micro-sites consisted of cover habitat of thick moss/needle duff at the edge of CWM pieces. Most mollusks were found at the interface of the duff and the humus layer.

#### Other Special Status Species

The proposed sale units and surrounding lands may provide habitat for 19 other special status species, which include five amphibians, seven mammals, and nine birds.

#### Amphibians:

The proposed sale units provide potential habitat for five special status amphibian species. The southern torrent salamander, tailed frog, and red-legged frog are associated predominantly with aquatic and riparian habitats; the clouded salamander and western toad also use upland habitats in association with down logs. Southern torrent salamanders were documented in the south half of the Burnt Ridge sale area.

Due to the close association of clouded salamanders to specific habitat components (primarily CWM), and the habitat damage associated with intensive searches, surveys for these species were not conducted. It was assumed that when key habitat components are present in sufficient quantity, suitable condition, and adequately distributed, populations of associated amphibians species should remain viable.

#### Mammals:

The proposed sale units may provide potential habitat for seven other special status mammal species. The habitat is of sufficient size to support the western gray squirrel and the white-footed vole, but neither species has been documented. Due to the young age of the stands proposed for treatment, it is unlikely that ringtail, American marten, or fisher currently inhabit the proposed sale units.

#### Standard and Guidelines for Protection of Bat Roost Structures:

The proposed timber sale units were surveyed for the presence of caves, talus, fractured rock faces, bridges, or other non-vegetative potential roost sites. No potential roost sites of these types were located. Potential foraging habitat is present for the Yuma myotis and Townsend's big-eared bats, if a suitable roost site exists within the vicinity of the sale.

#### Birds:

The proposed sale units may provide potential habitat for eight other special status bird species. A pair of Coopers hawks have been documented during the breeding season in the Beyers Way timber sale. Additional surveys determined that these birds are nesting within the original proposed sale unit. A fifteen acre reserve area around the nests is excluded from the sale area to protect the two Coopers Hawk nests. Pileated woodpeckers, northern pygmy owls, and northern saw-whet owls all have been sighted in LSR RO261 to the west, and may forage or nest within the proposed units. The habitat within these units may also be used, at least seasonally, by the remaining four species, Merlin, Allen's hummingbird, black phoebe, and loggerhead shrike, but their presence has not been documented within this part of the district. (The Wildlife Biologist's report is in the Analysis File).

## ***Hydrology***

The sale area is typical of the Coast Range in both climatic and hydrologic features. The climate is characterized by moderate temperatures, wet winters and cool, dry summers. Precipitation, mainly in the form of rain, is the major factor influencing the hydrologic characteristics and controlling the hydrologic cycle. The varied topography and high relief has a strong effect on the precipitation pattern, causing very large differences between individual areas, but normally receives approximately 70 inches annually. The intensity of precipitation is as variable as the amount, but storms of extreme intensity (6.5 to 7.5 inches of rain in 24 hours) are rare. Virtually all precipitation comes in the form of rain from general storms. Occasionally Arctic air meets an onshore flow, producing snow. Snow events lasting more than a few days, accumulating to a significant depth or producing rain-on-snow events, are rare. Approximately 80% of the precipitation occurs between October and March and the months of June, July, and August receive only 4% of the annual total. The precipitation produces an average annual yield of 50 inches. The distribution of the major precipitation events and the pattern of runoff/stream flow are directly related and is evident as the high flows are observed during the winter months and low flows are predominant in the summer. This direct relationship indicates water yield is dominated by direct storm runoff as opposed to base flow. The limited base flow results in systems that are "flashy" or very responsive to precipitation events and have little ability to maintain flows during dry periods. The "flashiness" or high hydraulic response of the systems can be contributed to many related factors including: climate, topography, precipitation pattern and intensity, geology, vegetative ground cover, and past management activities; however, the most dominate geologic factors are well drained soils and the lack of ground water storage.

Most of the sale area drains into the Tioga Creek watershed. Tioga Creek is a 6th order tributary that drains 24,678 acres and combines with the Williams River to form the South Fork of the Coos River. The eastern edge of Beyers Way CT, Unit 3 of Deadhorse CT and the northeastern portion of Burnt Ridge CT all drain into Gooseberry Gulch or Bear Gulch, which are tributaries of Williams River. All of the drainages in the sale area are low order (1-3) step/pool channels with low sinuosity, high entrenchment, low width/depth ratio, and lack floodplain development. All proposed road construction will take place on or near the ridges and should not cross any unstable headwalls. (The Hydrologist's report is in the Analysis File).

## ***Recreation Resources***

There are no developed, designated or improved recreation sites in the proposed sale area, and none are planned. The area offers opportunities for adventure driving, hiking, hunting, and other activities not dependent on facilities. Utilizing forest access roads is essential to recreate in this region, due to steep terrain and distance from towns. The Burnt Mountain/Skeeter Camp recreation site is about five miles away. It is a primitive developed site in the south resource area, and a popular hunting camp. There are at least three well established elk hunting camps used every year within the proposed thinning sites. New temporary roads may attract use by a few people, but overall public use of the area is not expected to change.

The proposed Tioga Special Recreation Management Area would not be affected.

## ***Rural/Forest Interface***

There are no rural developments or farmlands within at least five miles of the project area.

## ***Cultural Resources and Native American Religious Concerns***

There is one pre-historic site west of Burnt Ridge Road in Section 15 near the Nobletown waterhole. The site is adjacent to, but excluded from the project area.

There are two historic sites that have remnants of historic cabins from an old logging camp near the Beyers Way CT. They are adjacent to and located outside the boundary of the project area.

### ***Air Quality***

Air quality is good most of the year due to good air circulation at this high elevation site and its proximity to westerly flows of pristine air from the Pacific Ocean

### ***Solid and Hazardous Waste***

There are no known solid or hazardous waste sites in the project area.

### ***Special Management Areas***

Wilderness Areas: There are no Wilderness Areas in or near the project area.

Wild and Scenic Rivers: There are no Wild or Scenic Rivers in or near the project area.

Areas of Critical Environmental Concern(ACEC): There are no ACEC's in or near the project area.

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## ***Chapter IV - Environmental Consequences***

This chapter is organized by resources and describes the expected impacts as they relate to the alternatives.

### ***Impacts on Soils***

#### No Action Alternative

The No Action alternative would not alter existing soil conditions. There would be no new construction or harvesting activity that may cause some minor erosion. There would be no renovation, improvement of existing roads, or full decommissioning of existing roads, and therefore no opportunity for a net reduction in road densities or to eliminate potential sources of erosion.

#### Action Alternatives

The use of ground based logging systems will cause some soil displacement. The impact of ground based systems can be drastically reduced through the use of designated skid trails and traveling over slash generated from mechanical harvesters. Some minor soil displacement would be expected in yarding corridors from cable based yarding. Surface erosion generated during harvest, or road and landing construction, would travel very short distances before being trapped by duff and woody materials.

There would be 6.2 miles of road renovation/improvement. Approximately 1.0 miles of new road is proposed for construction. This would comprise approximately three acres of land being taken out of production. The new road construction is on ridgetops, so erosion and sedimentation would be minimal. Portions of the designated 6.2 miles of road renovation/improvement would follow the path of old skid roads; portions would include existing surfaced and dirt haul roads needing restoration of drainage function. Some soil erosion from cutbank sloughing and from the road surface can be expected, especially during heavy rains the first winter following construction.



### ***Impacts on Vegetation, including Sensitive Species***

#### No Action Alternative

##### Overstory

The No Action alternative would result in an eventual slowing of individual tree growth rates and total stand volume growth, and the individual tree growth would tend to stagnate with a high density of stems. Of all alternatives, the No Action alternative would result in the slowest development of large trees and, therefore, the slowest development of a potential source of large snags and CWM; the slowest development of vertical and horizontal structural complexity; and the least increase in tree species diversity. Thus, the No Action alternative would result in the slowest development of late-successional forest structural characteristics and good quality habitat for most species that are associated with late-successional forests.

The No Action alternative would also result in increased suppression mortality over time in the smaller tree diameters, increasing the number of small diameter snags. Understory development of trees would decline or cease due to increased shading. Wood products from future expected mortality would not be recovered. The reduced tree growth, tree vigor, stand development, and understory development toward late successional forest in the RRs would be similar to that described above for the GFMA.

##### Understory

Shade tolerant plants would increase. Plants requiring sunlight would decrease with increased shading over time.

##### Noxious Weeds

Noxious weed introduction and spread will continue based on human and natural events. Treatments of gorse will continue on a yearly basis until eradicated. Scotch and french brooms will be treated as time and funding allow. Known sites of the common St. Johns wort should be controlled on a yearly basis until eradicated and tansy ragwort will continue to be controlled by biological agents.

#### Action Alternatives

##### Overstory

Thinned areas would result in increased tree growth and vigor eventually producing larger healthier trees. In the long term (several decades) there would be increased quantity and quality of wood products available in the GFMA; and larger trees available in the RR for future sources of large woody material and snags. By the removal of the less thrifty trees in the thinning area there would be a short term reduction of suppressed and intermediate trees for potential future small snags and down logs. Of all action alternatives, Alternative 1 would result in the most acres with faster development of larger trees, larger snags and large woody material; and faster development of vertical and horizontal structural complexity. Alternative 2 would result in the least acres of faster tree growth and development. Alternative 3 would result in acres of increased tree vigor and growth between the level of Alternative 1 and 2, and would create more snags per acre in the short term. Commercial thinning can delay culmination of mean annual increment (MAI), and where timing of final harvest is based on culmination of MAI this has the effect of lengthening rotations for regeneration harvests.

Minor damage to bark of some residual trees is expected during harvest activities. A seasonal restriction for yarding during the spring when bark is loose should minimize tree damage. The number of new snags created from injured trees is unknown, but is estimated at 1 to 2 per acre. The tree ages in the project area are considered to be older than the window of susceptibility for blackstain disease, but there is a slight chance that blackstain could infect some damaged trees resulting in additional small snags.

Intensive forest practices used to develop a healthy overstory, such as planting, manual brush cutting, precommercial thinning, and fertilization, are expensive. These investments are recoverable on the Matrix lands through commercial thinning and final harvest. They are partially recoverable on reserved lands where there is density management treatment that includes wood removal, and unrecoverable where there is no wood removal associated with managing habitats. Alternative 1 would recover the most amount. Alternative 2 would recover the least amount. Alternative 3 would recover only slightly more than Alternative 2 due to the costs associated with snag creation.

#### Understory

By opening the stand up there could be an increase in the development of understory trees, particularly Western hemlock, resulting in a multi-level stand structure. Also, there likely would be an increase in brush and herbaceous species after the first year.

One year after thinning fine slash cover and volume should increase substantially as a result of thinning. Litter cover is expected to decrease slightly after thinning but the depth of the litter should increase. The amount of large wood/slash on the forest floor should not increase the first year after thinning. Vegetation on the forest floor should decrease slightly in the year after thinning (Chan 1995).

Harvesting the stand will increase its vulnerability to infestation by exotics, which thrive in the resulting disturbed soils and brighter light conditions. However, the canopy would eventually close, shading out weedy species. Some herbaceous species and epiphytes may have reduced vigor from the altering of the microclimate, while some species of herbs and shrubs would flourish from the increased sunlight. Eventually, as the forest grows, conditions would come to approximate the current condition.

#### Noxious Weeds

No impacts to existing populations of noxious weeds are expected due to the limited numbers of plants within the area of operations. The five species of concern are pioneer species for disturbed soil (mostly in sunny areas). Since soils would most likely not be disturbed, and any disturbance would be in shaded areas, the chances of any of these species growing or becoming established is at best minimal. By application of standard vehicle and equipment washing stipulations, with special emphasis on equipment which would be operating in the woods, the chance for introduction of new species of noxious weeds should be minimal.

### ***Impacts on Survey and Manage/ Protection Buffer Species***

#### No Action Alternative

There would be no significant negative consequences for botany or mollusks if the No Action Alternative were adopted.

#### Action Alternatives

The ground disturbing activities proposed in the action alternatives could potentially impact habitat and/or populations of S&M Strategy 1 and 2, and Protection Buffer species. Although surveys are not required for Strategy 1 species, if they are located while conducting surveys for other species, the locations would be managed according to the approved version of management recommendations.

Strategy 2 and Protection Buffer species locations would also be managed to ensure viability. Impacts are expected to be minimal due to :

- Reserving individual or clumped trees where botanical species were found within the units after extensive surveys were completed throughout the project area
- Reserving 50' radius buffers around individual mollusk sites located with the protocol surveys
- Reserving all CWM, where a majority of the mollusk were found during protocol visits
- Reserving several undisturbed areas throughout the project area described in "Areas Excluded from Thinning"
- Minimizing disturbance of CWM, duff layers, and individual mollusk sites by requiring either a low impact cut-to-length ground based or a skyline cable harvest system
- Maintaining 130-150 trees per acre after harvest on site should ensure an adequate shade level for retention of a microclimate favorable for mollusks
- Other suitable S & M or Protection Buffer habitats in the watershed will be left undisturbed because they are outside the project area and will not be thinned due to being either small, isolated, or otherwise unsuitable for thinning.

## ***Impacts on Aquatic Habitat/Fisheries, Including T & E Species***

### No Action

#### Special Status Species - Fish

Since there are no listed or candidate fish species found within the boundaries of the proposed timber sale, no direct or indirect positive or negative impacts would occur on site under this alternative. Upstream movement of resident cutthroat trout in the stream just below the waterhole in the northwest corner of the Burnt Ridge unit would continue to be prohibited by the barrier created by the culvert and waterhole outlet. Downstream populations of steelhead trout, coho salmon, and sea-run and resident cutthroat trout in the Tioga Creek and Williams River Watershed would not be affected under this alternative.

#### Aquatic Habitat/Fisheries Habitat

The quality and quantity of stream habitat can be directly related to stream channel complexity and relatively clean water. High quality aquatic habitat is a result of large in-stream features such as boulders and CWM distributed throughout the channel and adequate substrate for organisms to colonize. Where large logs are found in stream channels in these units, they provide adequate aquatic habitat features. These logs are generally class 4 and 5 and have a limited life as stable habitat structures. Most reaches of perennial stream in these units lack channel stability and in-stream habitat complexity.

Leaving these units untreated would produce the highest numbers of future down logs to the riparian and stream habitat, but these downed logs would be small diameter. These smaller logs do not provide the large, stable, in-channel structure needed to maintain good channel stability and in-stream complexity. Suppression mortality in these stands produces large amounts of organic matter that may enter streams, but does not provide durable and long lasting riparian/stream structure.

The numerous large logs that were left on site in riparian zones and streams will decompose long before they would be replaced by CWM of equal size. The stand trajectory, including the Riparian Reserves, which is set by no action will result in a delay in attaining late-successional characteristics and therefore the attainment of replacement CWM by many decades.

The present dense canopy closure provides considerable shading to perennial streams and aquatic habitat. These untreated units will continue to provide conditions that maintain high quality cold water to on-site streams, as well as delivering it to downstream fish bearing streams. These streams will continue to function at risk, in part due a deficiency of CWM for in-channel structure.

Line Creek Waterhole - This waterhole will continue to be operated as a tanker/pump chance. The existing brush and canopy cover would remain. The trout population below the road would continue to receive outflow from the surface of the pond which may have an elevated temperature in the summer months. Upstream access for fish and other aquatic species would continue to be blocked by the road/pond outflow.

Nobletown Waterhole - This waterhole will continue to be operated as a tanker and helicopter pond. It will be brushed to improve tanker or helicopter access. Surface water will continue to be released during the summer months.

#### Aquatic Conservation Strategy

With the No Action Alternative, the Aquatic Conservation Strategy objectives could be achieved in the long term in the 5<sup>th</sup> filed watershed, but little progress would be made in the near term in attaining ACS objectives on the proposed project site. The section titled "Consistency with the Aquatic Conservation Strategy Objectives" under Alternative 1 of this chapter describes how faster progress can be made toward achieving ACS objectives by thinning.

### Alternative 1

#### Special Status Species - Fish

Since there are no fish species present within the boundaries of these sales, no direct impacts to listed or candidate fish species are expected. Indirect impacts to the closest coho salmon and steelhead trout (1.5 to 2.0 miles downstream) are not expected.

#### Aquatic Habitat/Fisheries Habitat

Impacts of Harvest Actions - Measurable, direct negative impacts to aquatic/fishery habitat or water quality are not expected from the proposed actions of this alternative. Trees will be directionally felled away from stream channels. Skyline cable yarding will be designed to avoid yarding through perennial streams. Where yarding through perennial streams is not avoidable, full suspension will be required and trees cut to provide a corridor will be left on site. Mechanical harvester/forwarder equipment will not be operated in the riparian zone of any stream.

The use of ground based logging systems will cause some localized soil displacement; however soil displacement and compaction from ground based systems can be drastically reduced by traveling over the slash generated from harvester activities. Allan (1997) suggested that slash appears to protect against increased bulk densities as the number of passes increases, and wet soils may benefit more than dry from a slash layer. Under most circumstances, cut-to-length equipment makes fewer passes through a stand over less area than tree-length systems on a per-volume-removed basis. Another frequently cited benefit of cut-to-length systems is the manner in which the harvester lays down a mat of slash in its own path (Seixes, 1995).

As well as the use of traveling on slash, the use of designated skid trails can drastically reduce the impact of ground based systems. Studies of cut-to-length system have indicated that new entries produce no significant increase in compaction to old skid trails. The gentle slope of proposed ground based portions of these units greatly reduces the chances of transport of any sediment generated from harvest activities. Any surface erosion would travel very short distances before being trapped by the heavy duff layer and woody material that exists within the units. Areas identified for ground based harvesting are "low risk" for mass failure.

Incorporating the gentle slopes and the filtering action of the duff layer with the no entry stream protection buffers ensures, with a high degree of confidence, that no measurable amount of sediment will enter stream channels and that turbidity levels will not be elevated above background levels from the use of ground based harvest equipment.

Roads - No measurable impacts to aquatic habitat or the Riparian Reserve are expected from new road construction or the improvement/renovation of existing road surfaces. All applicable best management practices will be used for construction and renovation. No new roads will cross stream channels or would be built in Riparian Reserves. Existing roads in the units to be improved/renovated are ridgetop with no stream crossings. Haul route improvement/renovation will also include ditch relief culverts. All new road construction will consist of semi-permanent ridgetop spur roads. All new constructed spur roads, landings, and improved/renovated dirt spurs would be fully decommissioned to pre-project hydrologic function.

Large Woody Material (LWM) - The Tioga Creek Watershed Analysis indicates that hill slope processes are vital to providing long lasting durable LWM to the main stem Tioga Creek and it's larger tributaries. This LWM accumulates in stream channels creating a wide diversity of aquatic habitat features. Much of this material originates from the upper areas of tributary streams and enters Tioga Creek through episodic landslides or other hillslope processes. Individually arranged whole trees are more commonly recruited as they fall to the channel from within a half site-potential tree distance of the riparian zones. If large tree recruitment is to occur, large trees are required to be positioned across the landscape at sites capable of contributing to landslides as they happen.

Streams within this sale area are deficient in LWM in their channels. Numerous streams have potential to develop landslides that contribute LWM to downstream fish bearing channels. A goal of Aquatic Conservation Strategy is to re-establish large trees (20-50 inches DBH) on sites that are likely to contribute to the on-site, as well as downstream, aquatic habitats through hill slope processes.

Based on present average tree diameter and height, obtaining a functional piece of LWM to the stream channel would require a tree to fall to the channel from within approximately 30 feet of the stream edge. Only small diameter tops are expected to reach stream channels if they fall from 30 to 60 feet from stream edge. These small diameter pieces contribute little to long term stream functions.

Thinning - The proposal to leave similar numbers of trees in the Riparian Reserves to within 25 feet of streams as on Matrix is a conservative prescription that foregoes the most rapid attainment of large diameter trees adjacent to streams in favor of maintaining the connectivity function of the canopy for upland species. This

conservative approach would necessitate a second density management entry in the future to keep the Riparian Reserve stands on a trajectory to develop late-successional characteristics. This is in line with objectives set in the South Fork Coos WA where the prime objective is to provide for LSR connectivity. This is done by maintaining a relatively tight minimum canopy closure of 40% which will be exceeded by the remaining 130 -150 tpa spacing. This light silvicultural treatment prepares the stand for a second density management entry by building tree strength (increased root mass, crown diameter, and stem size). A second entry will hasten the development of LSR characteristics by introducing a multilayered canopy structure. At this residual tree density, Riparian Reserve trees will continue to contribute adequate shade to the stream channel. Competition mortality will be delayed in the area of thinned Riparian Reserve, but over time, contributions of functional sized LWM to the channel will be accelerated.

Entering the Riparian Reserve to obtain these characteristics for objectives other than on site fishery, while still maintaining or restoring riparian, stream channel, and aquatic habitat functions can occur and is the basis for this alternative. These functions can benefit from the proposal to create LWM in the Riparian Reserve.

Water Quality - Widely spaced skyline cable yarding is occasionally going to occur directly on or over a perennial stream; however, there should be little to no impact to water quality from this harvest activity under this alternative. Culvert replacement could generate small amounts of suspended and bedload sediment, but it is expected to be minimized due to the application of best management practices and the general low gradient of streams within these units. Any sediment reaching stream channels will be naturally sorted and stored within the channel and is not expected to leave the unit boundaries or reach downstream fish bearing streams.

Direct shade to intermittent and perennial stream channels will be adequately maintained by the proposed no-cut reserve of the riparian zone. Side lighting will be minimized and reduced as tree canopy cover responds to the thinning by becoming more dense. Cold, high quality water will continue to be provided to downstream fish bearing streams.

Aquatic Conservation Strategy objectives would not be retarded with this alternative. The stand, including the Riparian Reserve, would benefit from improved tree vigor. This light silvicultural treatment prepares the stand for a second density management entry by building tree strength (increased root mass, crown diameter, and stem size). A second entry will then hasten the development of late-successional stand characteristics and the restoration of key ACS objectives.

Line Creek Waterhole - Renovation and brush removal along the approach road is not expected to impact water quality or downstream fish habitat.

Nobletown Waterhole - Renovation and brush removal along the approach road is not expected to impact water quality or downstream fish habitat.

#### Consistency with the Aquatic Conservation Strategy Objectives

Alternative 1 (Proposed Action), which proposes thinning in the Riparian Reserves, is consistent with attaining Aquatic Conservation Strategy objectives on the proposed project area in the short term and long term as described below:

*Objective 1: Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.*

The proposed commercial thinning would maintain and enhance the distribution, diversity, and complexity of the watershed and landscape-scale features. The thinned areas would add to the diversity of the landscape which consists primarily of dense stands of trees that are becoming too crowded for healthy growth. Thinning from 200-424 tpa to 130-150 tpa will open up the understory and will allow development of understory trees and shrubs for a multi-layered canopy, enhancing the diversity of the stand until canopy closure. Thinning throughout the project area will focus on leaving the largest dominant and co-dominant trees. These trees will grow to larger diameters than similar trees in the un-thinned stand (USDI 1991) which will provide for larger snags and CWM while enhancing the health and vigor of the residual trees. The no cut streamside buffer will protect the local

aquatic system from harvest disturbance. The remaining area within upland zone of the RR will be managed for the development of larger diameter trees and understory diversity.

*Objective 2: Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species*

These thinning will maintain both spatial and temporal connectivity within and between watersheds by retaining various no harvest riparian zone widths for all streams within the project area. Commercial thinning would not change the spatial patterns of the different stands within and between watersheds as a continuous stand would still remain after the thinning. Riparian-dependent organisms will continue to utilize habitats within the no harvest riparian zones and thinning will provide habitat to wildlife species that prefer less dense forested stands. The release of understory shrub and tree species in the stand will, over time, provide connectivity at several canopy levels. No actions are proposed that would physically or chemically obstruct routes to areas within or outside the watershed that are critical for fulfilling life history requirements of aquatic and riparian-dependent species.

*Objective 3: Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*

These thinning will, over the long term, maintain and restore the physical integrity of the stream and wetland aquatic systems. The no-cut riparian zone along all streams would maintain tree/shrub root strength and the physical streambank integrity. Channel morphology will be maintained by minimizing activities on or over streams and retaining existing in-channel woody material. No roads or landings would be constructed within the Riparian Reserves.

Yarding through Riparian Reserves would be minimized and corridor width would be no wider than 10 -12 feet. One end suspension could occur only at a few locations and would not significantly impact the vegetation or streambank integrity in the riparian zone. Trees cut to create yarding corridors will be left in the riparian zone and could be used to deflect logs being yarded.

Growing larger trees in a shorter amount of time, some of which will eventually be recruited to the stream channel, would help to restore the complexity of the aquatic ecosystem.

*Objective 4: Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*

Present tree and shrub density in the riparian zone provides nearly a 100% canopy cover over all streams. The proposed thinning management will require a variable no-cut riparian zone buffer which would provide adequate shade for maintaining ambient stream water temperatures. These thinning sales are ridgetop and most of the streams associated with them originate on-site from springs or seeps which have cold, high quality water. Most streams in the sale area are also small in size or intermittent in nature which makes them less susceptible to heating. All streams are above fish passage barriers and contain no fish species, but have a good diversity of aquatic vertebrate and invertebrate species. Water quality will be maintained.

*Objective 5: Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.*

It is recognized that sediment delivery, storage, and transport are essential functions of stream systems and contribute to the maintenance of riparian and aquatic ecosystems. Under natural conditions these mechanisms are driven primarily by infrequent high intensity storm events, although higher frequency less intense storm events also contribute, and other disturbances such as fire and wind which help trigger landslide processes.

These thinning are located on a ridgetop. Much of this ridgetop is flat cap-stone like terrain. The thinning would not prevent or retard restoration of the sediment regime under which this aquatic ecosystem evolved. Streams in this area are low gradient and low energy in nature and do not naturally produce high amounts of sediment. A

thick duff layer and dense vegetation found in many no-cut riparian zone buffers will effectively filter mobilized soil and fine particles dislodged through harvest activities. Best Management Practices for the prevention of soil loss and sedimentation will be adequate to maintain the natural processes that occur on site including the sediment regime.

*Objective 6: Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.*

Streamflows, (peak, high, and low flows) are directly related to and influenced by the size of a precipitation event. The greater the amount of water going into a system, the larger the potential streamflow. The quantity of water and the rate at which it reaches the channel and passes through the system during a particular storm event is influenced by storm and watershed size, vegetative cover, topographic features, and/or existing roads. The proposed action will, to a very small degree, influence only the vegetation cover.

The no-cut riparian zone buffers establishment from this proposed action will help ensure that in-stream flows of the perennial and intermittent streams will not be impacted by timber harvest actions. Maintaining a tree density of 130 to 150 trees per acre within the Riparian Reserve will maintain sediment, nutrient, and wood routing in the aquatic system while protecting the timing, magnitude, and spatial distribution of the flow regime.

*Objective 7: Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.*

The no-cut riparian zones of each stream should provide the vegetative complexity needed to maintain the timing, variability, and duration of the floodplain inundation. The no-cut riparian zone buffers around meadow and wetland vegetation will maintain the water table elevation by reducing solar intensity through shading, maintaining bank stability, maintaining microclimates around down logs, litter layers, and providing duff and litter recruitment. The no-cut riparian zone buffers will eliminate the risk of soil compaction thus maintaining infiltration rates and the capacity to store water.

*Objective 8: Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.*

This treatment should help to maintain and restore species composition and structural diversity of plant communities in the riparian areas. Thinning in the Riparian Reserve will create larger, more vigorous trees in the long term. Some of these larger trees will eventually provide large woody material for streams, and snags in the Riparian Reserve. Physical complexity will be restored through the addition of larger snags, large woody debris, trees with deeper crowns, variability in tree sizes, and increased understory vegetation.

The proposed thinning treatment will set a trajectory for development of late-successional characteristics in which a second entry would provide increased growing space, additional snags/large woody material, and increased recruitment and survival of understory trees. The development of understory trees and shrubs will create a multilayered canopy and increased species diversity.

The proposed action will maintain species composition and structural diversity of plant communities in riparian areas and wetlands due to the establishment of no-cut buffers and the implementation of project design criteria.

*Objective 9: Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.*

Thinning prescriptions that include no treatment protection buffers and leave areas; contain design features to retain or recruit large snags and down wood; and provide for retaining the full range of tree species in the project area will result in greater post-treatment diversity of habitats. Thinning will speed the stand's transition from mid-seral to mature (when defined based on average stand diameters and abundance of understory vegetation), by shortening the time the stand is in the stem exclusion stage of stand development (Oliver and Larsen 1990). Thinning will increase tree crown depth and volume, will increase understory vegetation size vigor and diversity,

and by increasing tree size growth trees will have greater bole surface area and increased bark furrowing. The net effect is a greater and more diverse range of habitats for riparian-dependent species.

#### Alternative 2 and 3

Both alternatives are expected to have similar impacts and are analyzed together.

#### Special Status Species - Fish

Since there are no fish species present within the boundaries of these sales, no direct impacts to listed or candidate fish species are expected. Indirect impacts to the closest coho salmon and steelhead trout (1.5 to 2.0 miles downstream) are not expected.

#### Aquatic Habitat/Fisheries Habitat

##### Impacts of Harvest Actions -

No direct or indirect impacts to aquatic/fishery habitat or water quality are expected from timber harvest activities proposed for these alternatives. There will be no activities within the Riparian Reserves or in the riparian zones under Alternative 2. Under Alternative 3 only the first 60 feet of Riparian Reserve will receive a light thinning, while the remaining 160 feet will not be entered. Impacts are expected to be the same as for the No Action Alternative.

Roads - The same amount of new and improved/renovated road surface is expected under these alternatives. No measurable impacts are expected from new road construction or the improvement/renovation of existing road surfaces. No new roads will cross stream channels or be built in Riparian Reserves. Existing roads in the units to be improved/renovated are ridgetop with no stream crossings. All new road construction will consist of semi-permanent ridgetop spur roads. All newly constructed spur roads, landings, and improved/renovated dirt spurs would be decommissioned after final harvest.

Large Woody Material - The creation of 2 snags per acre by cutting tree tops as proposed in Alternative 3 will have no influence on the recruitment of LWM to stream channels. Even if snags created from the current average size tree in these units were to reach stream channels, they would not contribute a log large enough to be suitable as long lasting structure.

Water Quality - Since there should be no harvest related actions directly on or over perennial stream water there should be no impacts to water quality from harvest activities under Alternative 2 and 3. Culvert replacement could generate small amounts of suspended and bedload sediment, but it is not expected to travel far due to the low gradient of streams within these sales and the application of best management practices (BMP's). Any sediment generated is not expected to leave the unit boundaries and reach downstream fish bearing streams.

Direct shade to intermittent and perennial stream water will be maintained by the dense forest conditions in the Riparian Reserves. Cold, high quality water will continue to be provided to downstream fish bearing streams.

Waterhole Maintenance - Same as Alternative 1.

#### Aquatic Conservation Strategy

With Alternatives 2 and 3, the attainment of Aquatic Conservation Strategy objectives could be achieved in the long term in the 5<sup>th</sup> field watershed, but little progress would be made in the near term toward attaining ACS objectives on the proposed project site. Thinning the upland 60 feet of the RR as proposed in Alternative 3 would provide faster attainment of ACS objectives within that portion of the RRs. No thinning in the RRs as proposed in Alternative 2 would have the same effect as the No Action Alternative. The section under Alternative 1 of this chapter titled "Consistency with the Aquatic Conservation Strategy Objectives" describes how faster progress can be made toward achieving ACS objectives by thinning in the RRs.



## ***Impacts on Wildlife Species & Habitats***

### No Action Alternative

#### Road, Landings, & Access

No road construction or renovation would occur, so habitat within the old road prism would remain intact, and the existing road beds would continue to recover from compaction caused by previous harvests. As vegetation continues to reestablish on the old road surfaces, the road corridors would be eliminated and these areas would no longer function as human-made barriers to any wildlife species. Additionally, human disturbances to wildlife would remain limited to existing open roads.

#### Snags and Coarse Woody Material

All existing snags and CWM would remain intact and undamaged, and natural forest development processes would continue to operate across the entire 779 acres. As the largest or most competitive trees become dominant, suppressed trees would die from light competition, providing a periodic input of new, smaller diameter snags and down logs throughout the entire project area. Although no new snags would be created immediately through treatment as in Alternative 3, abundant small diameter snags and down wood would continue to be created through suppression mortality.

#### Vegetative and Structural Habitat Complexity (GFMA and Riparian Reserves)

The natural forest development processes would continue to slowly operate in the entire 779 acres, allowing environmental variations and small scale natural disturbance processes to increase forest variability. Barring windthrow or other such catastrophic events, the trees would have short crowns, small diameters relative to the height, small length and diameter branch size, and low root mass to crown production. Limited understory regeneration would occur and would be confined to open patches and edges. The understory vegetation that established would not be vigorous, would have little to no growth, and would have flat-topped growth forms. Suppression mortality would provide snags and down wood, however they would be small in size and last a relatively short time. The stands would be approximately 200 years of age before they develop the forest structure and diversity of a late-seral stand (USDI 1999).

#### Habitat Disturbance

If the proposed area is not harvested, no disturbances associated with these operations would occur.

#### Wildlife Species of Special Concern

If the proposed area is not harvested, the impacts to wildlife species expected under the Action Alternatives would not occur. Habitat changes would in most cases be gradual, allowing less mobile species such as amphibians sufficient time to adapt, or move to new locations. Additionally, the vegetative habitat characteristics of the entire 779 acres would remain favorable for species such as the Cooper's hawk which are especially sensitive to changes in stand density and canopy closure.

#### Cumulative Effects

There would be no local level cumulative impacts. Landscape level cumulative impacts have been analyzed in the FEIS, ROD and RMP.

### Affects Common To All Action Alternatives

#### Road, Landings, & Access

The 1.2 miles of new road construction and 6.6 miles of renovation and improvement would alter or destroy wildlife habitat within the actual road prism. The road corridors may also function as partial barriers to certain wildlife species which have limited mobility (such as some amphibians). The road corridor could encourage some avian predators to extend their foraging further into the stands which would affect some bird species. The new or renovated roads which are not closed following completion of harvest activities would provide increased human access causing disturbance and mortality from road kills to many wildlife species. Cole et al. (1996) reported that elk avoided areas within 492 feet of roads.

Negative impacts of road construction and renovation would be minimized by using minimum clearing corridors and road surface widths; natural surfaced roads where ever possible; and closing these new roads after harvest.

Additionally, using natural surface roads should speed vegetation reestablishment and recovery of these roads. Subsoiling could be used to reduce compaction and increase the rate at which the road beds recover, but it would likely take at least 20-25 years before vegetation recovers sufficiently to reduce wildlife habitat impacts. With the reopening of these roads for final harvest likely to occur 30-40 years after thinning, the expected wildlife benefits from subsoiling these roads would be very limited relative to the cost of treatment.

#### Snags and Coarse Woody Material

The two main impacts on snags and down logs would be logging damage to the existing structures, and the reduced potential for future natural recruitment of small diameter snags and logs through suppression mortality. Thinning would have little effect on existing snags because they would be protected from cutting. The ground based system would have less impact on the snags/CWM as it would have the capacity to move around them verses the cable system that must put the corridors through designated areas that may contain snags or CWM. Logging injury to leave trees and other treatment related mortality could recruit new CWM and snags; however, this is not a reliable recruitment mechanism because the potential for mortality is also related to near term weather related stress and damage.

#### Alternative 1

##### Snags and Coarse Woody Material

Management practices commonly applied before the Forest Plan resulted in a loss of both snag and CWM. Wildlife tree retention was not required until 1983 on BLM and 1991 on private land. Although the Forest Plan now requires protection of CWM and snag habitats, the majority of the BLM land harvested was completed before the policies to protect snags and down wood went into affect. This indicates that restoration and protection of snag and down log habitat should be considered a priority for wildlife habitat management within the subwatershed.

Removal of 60-330 green trees per acre from the areas proposed for thinning would reduce the future recruitment of small decay class 1 and 2 snags and down logs within these stands and the subwatershed. In unmanaged stands, the strongest and healthiest trees compete most effectively for light, suppressing and eventually killing their less competitive neighbors, reducing stand densities and providing a gradual input of class 1 and 2 snags and down logs. Although the 8-14 inch snags typically created by suppression mortality in regenerating stands do not provide suitable nesting habitat for the larger cavity associated species, smaller woodpeckers, songbirds, and owls do nest in them. Additionally, these snags provide an important feeding resource for most cavity associated species and their prey. This food resource can be especially important when the landscape (such as the Tioga Creek subwatershed) is dominated by large areas of early or mid-successional forests where snags and down logs are scarce. Down logs likewise provide key habitat for a variety of small mammals and amphibians, serving as foraging, nesting, cover and dispersal habitat. COPE program research suggests that the larger diameter trees in thinned stands provide a better prey substrate for insectivore birds than small diameter trees in unthinned stands (Weikel & Hayes 1997).

The life cycles of many wildlife species associated with snags or CWM are closely tied to specific stages in the decomposition process. The insect species inhabiting snags or logs change as the structure decays, providing different prey species for foraging wildlife. Many amphibians are tied to specific habitat features such as loose bark present on class 1 and 2 logs, while small mammals may focus on fungi present during a certain decay stage.

Although damage from logging would provide 1 to 2 snags per acre immediately after harvest, thinning 298 acres of GFMA and 398 acres of Riparian Reserves proposed in this alternative would remove most of the trees that would become snags and logs under natural processes over the next 30 years. Approximately 83 acres (11 percent) of the total project area would not be thinned due to a No Treatment zone of 25 feet on each side of the streams. Some stream areas would have wider buffers or would be excluded from thinning due to various project design criteria.

##### Vegetative and Structural Habitat Complexity

The abundance and distribution of wildlife species are controlled by a wide variety of habitat characteristics that in forest dominated systems are directly tied to the vegetative and structural complexity of forests stands. Managed plantations and landscapes in the Oregon Coast Range typically have lower vegetative and structural

complexity than natural forests, because harvest and reforestation techniques used are based upon simplified stand development models targeting selected periods in the forest development process (USDI 1996).

Under this alternative, the majority of the units would be thinned to retain 130-150 of the healthiest most vigorous trees per acre, with the intent of reducing overstory competition and increasing the growth rate of the leave trees. Although the proposed sale units would not be fully uniform after harvest, variability in tree size would be substantially reduced.

The current stands were regenerated after harvest with high densities and do not have much structural diversity or understory vegetation. Thinning would open up light to the understory and diversify the species composition until canopy closure again occurs. A more diverse understory would provide nesting, roosting, and foraging habitat for small birds and mammals, and provide forage for big game.

Recent studies in the Oregon Coast Range have evaluated the effects of varying thinning regimes on a number of wildlife species. Although some treatments apparently reduced habitat utilization by some species, in most cases there were either minor differences or significant increases in the observations of bird, mammal, and amphibian species following thinning. The following research indicates the importance of thinning/density management in relation to habitat preferences by different wildlife species:

- ! Both cavity-nesting birds and birds normally associated with hardwoods, increased in abundance after thinning, even with a reduction in snags. The reasons are not known, but thinned stands tend to provide increase foraging for these birds (Hagar 1997).
- ! Of the bird species observed at least 50 times before and after thinning, five appear to have increased in response to thinning, three apparently decreased and five showed no obvious change (Adam, Hayes, and Weeks 1995).
- ! Captures were substantially higher for chipmunks and flying squirrels in the post-treatment year (commercial thinning) as compared to pre-treatment sampling in most of the 12 stands (Anthony and Gomex 1995).
- ! Thinning in young and managed mature forests could help to create marbled murrelet habitat in the long-term by accelerating tree growth, increasing branch diameter, and creating large tree crowns. Marbled murrelets do not build nests; they are dependant on large, usually moss covered limbs (Nelson 1997).
- ! Thinning can result in an abundance of forage supply for deer and elk populations (Edge 1997).
- ! Recent studies have found that growth patterns of trees in many old growth stands in the Coast Range developed with only 30 - 50 trees per acre (Tappeiner, et al. 1997). This is in contrast to the high stand density found in many of our young stands. Densities between 30 and 50 tpa provided open canopies and good understory development (Emmingham 1997).

#### Riparian Reserves

Thinning in Riparian Reserves would result in only minor short term impacts for long term gains toward old growth structural habitat. Thinning would remove those trees that would have died through suppression, however, the remaining trees would grow to larger diameters (USDI 1999) which would allow for larger snags and down wood over time and would provide for more suitable wildlife habitat in the long term. USDI (1999) estimates that it would take an unthinned stand 200 years to develop forest structure and diversity. Under conventional thinning the stand would reach this stage at approximately 160 years with larger diameter trees than unthinned stands. A second entry in the future, to provide additional growing space, recruit and insure survival of understory trees, and create additional snags, would further shorten that period.

South Fork Coos Watershed Analysis (USDI 1999) and LSR Assessment (USDI 1998) calls for retaining at least 3 snags per acre on north facing slopes and 1 snag per acre on south facing slopes. This alternative should meet the above snag management recommendations for density management due to expected logging damage of 1 to 2 trees per acre and by reserving existing snags.

The current stands (including GFMA and Riparian Reserves) were regenerated following timber harvest - with high densities - and do not have much structural diversity, or much of an understory. Thinning would open up light to the understory and diversify species until canopy closure. A more diverse understory would provide nesting, roosting and foraging habitat for small birds and mammals, and provide forage for big game.

The proposal to leave the same trees per acre in the Riparian Reserves as in the GFMA is a conservative prescription that foregoes the most rapid attainment of late successional characteristics in favor of maintaining maximum connectivity function. This conservative approach would necessitate a second density management entry in the future to keep the Riparian Reserves on a trajectory to develop late-successional characteristics. This is in line with objectives set in the South Fork Coos Watershed Analysis (USDI 1999) where the prime objective is to provide for LSR connectivity. This is done by maintaining at least a 40% canopy closure which is attained by the 130 -150 tpa spacing. The next objective would be to set the trajectory for the creation of late-successional characteristics for the Riparian Reserves. This silvicultural treatment would prepare the stand for a second density management entry by building tree strength (increased root mass, crown diameter and stem size).

#### Habitat Disturbance

Many wildlife species would be disturbed to some degree by the falling and yarding, and use of heavy equipment during commercial thinning harvests. Mobile species such as larger mammals and birds typically move out of the area while harvest activities are occurring, and if key habitat features are altered, may not return until the habitat recovers. Less mobile species such as amphibians and small mammals may be incapable of leaving the area. Some species may seek refuge in trees, under logs or in the soil, but many may also be killed. Although species specific responses may vary, minimizing human disturbance of wildlife habitat should benefit most native species. Under this alternative, approximately 89 percent of proposed units would be directly affected by the physical habitat disturbances caused during harvest operations.

#### Wildlife Species of Special Concern

##### Other Special Status Species

###### Amphibians:

Only the clouded salamander and the Western toad are likely to be substantially affected by the proposed treatments. Tree falling, yarding and use of heavy equipment would damage some existing down logs that provide key thermal cover and foraging habitat for these species.

###### Mammals:

The other special status mammal species described in the Section III would not be substantially affected by the proposed thinning.

###### Birds:

Thinning of the 696 acres within the proposed sale areas would substantially alter the habitat characteristics for all eight special status bird species. Accipiters such as the Cooper's hawk select stands with high canopy closure and tree density, usually between 30 and 70 years of age for nesting (Reynolds 1983), such as the proposed sale areas. These dense stands serve to protect both adults and young from predators, and provide shaded, relatively mild environments for the nest site (Reynolds 1983). Thinning the entire sale area would alter the stand density and canopy closure, thus making the thinned areas unsuitable for accipiter nesting habitat.

The five other special status bird species would also be affected to a lesser degree by changes in stand density, canopy structure and understory vegetation. Thinning will increase tree crown depth and volume, will increase understory vegetation size vigor and diversity, and by increasing tree size growth trees will have greater bole surface area and increased bark furrowing. The net effect is greater and more diverse range of foraging substrate surface areas usable by several bird species (Weikel and Hayes 1997).

#### Cumulative Effects

BLM administers nearly all the land in a large block of the Tioga Creek Subwatershed, but the subwatershed is bordered on the east by a very large block of private timber lands. Most of the lands in this area were harvested

in the 1960's or 1970's, and both public and private lands in this area are dominated by young (0-50 year old), vegetatively and structurally simplified second growth plantations. Fifty percent (35,583 acres) of the lands in the Late-Successional Reserve, to the west of the project area support late-successional stands (USDI 1998). In the GFMA older forest habitat is limited to small patches and riparian stringers. Private timber companies would be expected to continue intensively managing their forest lands on short 40-60 year rotation cycles for the foreseeable future in a manner consistent with Oregon Forest Practices Regulations, and in the case of Weyerhaeuser, consistent with an agreed upon Habitat Conservation Plan for the northern spotted owl.

Under the RMP, harvest and silvicultural treatments (such as thinning) designed to provide economic benefits are a key consideration for the GFMA. Therefore, commercially thinning the 298 acres of GFMA under this alternative would meet the primary RMP objectives. Managing the Riparian Reserves for connectivity into LSR #261 would meet ROD objectives (1994, pg. 7) and would meet recommendations from the South Fork Coos Watershed Analysis (1999, pg. 44).

### Alternative 2

The effects of thinning under this alternative would be similar to those discussed in Alternative 1, but thinning would be conducted only on the 298 acres (38 percent) of lands within the proposed timber sale areas. Thinning would be limited to the GFMA lands, and would not occur within the Riparian Reserves.

#### Snags and Coarse Woody Material

The impacts to existing and potential snags and down logs would occur on only 38 percent of the project area. Natural snag and down log recruitment would continue to occur within the 481 acres (62 percent) designated as Riparian Reserves, providing a moderate level of small diameter snag and down log recruitment distributed across the landscape.

#### Vegetative and Structural Habitat Complexity

Changes in vegetative and structural habitat complexity through thinning would occur on only 38 percent of the timber sale areas as described in Alternative 1. The self-thinning processes and relatively little change in vegetative and structural habitat complexity would continue to operate on the 481 acres (62 percent) designated as Riparian Reserves as described in the No Action Alternative.

#### Habitat Disturbance

Wildlife habitat within the Riparian Reserves would not be directly affected by the proposed harvest activities, and wildlife habitat disturbance would be reduced compared to Alternative 1 and 3.

#### Wildlife Species of Special Concern

The 481 acres of wildlife habitat within the Riparian Reserves would not be directly affected by the proposed harvest activities, providing greater habitat availability for those species dependent on dense stands with a high canopy cover percent.

#### Cumulative Effects

This alternative would provide increased protection from logging damage to existing snag and down log habitat in the Riparian Reserves, and would have a higher potential for periodic natural recruitment of additional small diameter class 1 and 2 snags and down logs than Alternative 1 and 3. However, with no thinning in the Reserves, dense areas of suppressed Douglas-fir would remain until the stand had self-thinned, delaying attainment of some late-successional characteristics for as long as 200 years (USDI 1999). The canopy cover would remain the same which would deter the development of understory shrub, herb, and forb layers. Vertical stand complexity would remain relatively unchanged over the next several decades.

### Alternative 3

The effects of thinning under this alternative would be similar to those discussed in Alternative 1, but thinning would be conducted on a total of 443 acres (57 percent) of the lands within the proposed units. Commercial thinning would occur on 298 acres of GFMA and 145 acres of Riparian Reserves (the upland 60 feet).

#### Snags and Coarse Woody Material

The impacts to existing and potential snags and down logs would occur on 57 percent of the timber sale areas. Natural snag and down log recruitment would continue to occur within the 336 acres (43 percent) of the Riparian Reserves not thinned, providing a moderate level of snag and down log recruitment distributed across the landscape. Additionally, the value of timber harvested from the 145 acres of thinned Riparian Reserves would be used to fund the creation of 2 snags per acre distributed across the entire 779 acres of the proposed project area. The increased protection of existing snag and down log habitat in the Riparian Reserves, the potential for periodic natural recruitment of additional class 1 and 2 snags and down logs, and creation of additional new snags across the entire sale area would provide greater benefits to wildlife species associated with these structures than either Alternative 1 or Alternative 2. This alternative would meet the snag management recommendations for density management in the South Fork Coos Watershed Analysis (USDI 1999) and the LSR Assessment (USDI 1998).

#### Vegetative and Structural Habitat Complexity

Changes in vegetative and structural habitat complexity as described in Alternative 1 would occur on 298 acres of GFMA, but only on 145 acres of Riparian Reserves (the upland 60 feet). Natural disturbance processes would continue to operate on the 336 acres (43 percent) designated as Riparian Reserves as described in the No Action Alternative, allowing the full range of wildlife habitats to develop. Although the unthinned area available for future recruitment of smaller snags and down logs is less than in Alternative 2, this reduction would be offset by the creation of 2 snags per acre distributed across the entire 779 acres. The increased snag numbers and small decay class 1 and 2 down logs from the topped trees, well distributed across the landscape, would provide substantially greater benefits to wildlife species than Alternatives 1 and 2.

#### Habitat Disturbance

Direct disturbance to wildlife habitats would occur on all 298 acres of GFMA, but only on 145 acres of Riparian Reserves (the upland 60 feet). Except for occasional access roads or skid trails, the remaining 336 acres (43 percent) of wildlife habitat within the Riparian Reserves would not be directly affected by the proposed harvest activities. There would be reduced disturbance to wildlife compared to Alternative 1, but there would be more disturbance to wildlife compared to Alternative 2.

#### Wildlife Species of Special Concern

The effects of thinning on wildlife species of special concern under this alternative would be similar to those discussed under Alternative 1, but harvest activities would be limited to the 443 acres (57 percent) of the total lands within the proposed timber sales. Except for occasional access roads or skid trails, the remaining 336 acres (43 percent) of wildlife habitat within the Riparian Reserves would not be directly affected by the proposed harvest activities, and would provide greater habitat availability for those species that utilize dense stands with a high canopy cover percent.

The creation of approximately 2 snags per acre across the entire 779 acres of the proposed sale areas would benefit many wildlife species. These 1550 additional snags would also provide a substantial increase in foraging sites for woodpeckers and nesting habitat for some of the smaller woodpeckers and secondary cavity nesting birds. As these snags fall to become down logs, they would provide input of new down log habitat important for the terrestrial amphibians such as the clouded salamander, and a variety of small mammals preyed upon by Northern pygmy and Northern saw-whet owls.

#### Cumulative Effects

Under the RMP, harvest and silvicultural treatments (such as thinning) designed to provide economic benefits are a key consideration for the GFMA. Therefore, commercially thinning the 298 acres of GFMA under this alternative would meet the primary RMP objectives.

Only 30 percent of the Riparian Reserves would be actively managed for connectivity into LSR #261. The other 70 percent would naturally self-thin and would progress toward late-successional characteristics at a slower pace.

This alternative would provide more snag habitat than the other Action Alternatives across the entire project area, which would increase the abundance and distribution of snags, and subsequently down logs, throughout the landscape in the near term. In the long term the slower growth rates in the unthinned portions of the project area would produce fewer large diameter trees from which large snags and large down wood could be recruited via

natural processes or active management as compared to the other Action Alternatives. This alternative would produce more small snags and pieces of down wood but that material would be smaller. This would benefit those species that are either not sensitive to the CWM size or would benefit from abundant levels of small down wood and snags. This would also delay attainment of habitat for those species that depend on the larger diameter classes of down wood and snags.

### ***Impacts on Hydrology***

#### No Action Alternative

With no action no direct or indirect effects on the hydrology of the drainages is expected to occur.

#### Action Alternatives

##### Direct

Little effect on the hydrology of the drainages in the sale area or Tioga Creek or Williams River is expected following this project. Since individual trees or small groups of trees are to be removed, the remaining trees are expected to utilize any increase in water or soil moisture. This "edge effect" eliminates the corresponding reduction in evapo-transpiration losses normally associated with the removal of vegetation. The vegetation utilizing the water on site is going to be altered but the timing and the amount of water used is not expected to change.

##### Indirect

There is little, if any increase anticipated in the amount of sediment delivered directly to the drainages or Tioga Creek or Williams River due to the limited routing of sediment through the remaining vegetation and slash. Some short term sediment delivery may result from road renovation but this may also be offset by correcting any drainage problems on existing roads and/or culvert replacements. It should be noted that any sediment resulting from this project would be insignificant in comparison to a mass failure, which is the most likely mechanism to deliver large quantities of sediment and debris to the drainages. Any sediment resulting from road construction or renovation is expected to be minimized because the construction and renovation should meet the design features and management directives listed in Chapter II of this EA.

#### Cumulative Effects

The Action Alternatives could have the effects listed above at the site scale. However any effects, even if quite large on a site, become increasing difficult to detect downstream because of fluctuations in flows due to the timing and varying intensities of precipitation events. This natural variability coupled with the fact that as small streams join and form increasingly large drainage networks, the ability of individual actions to affect the hydrology in the larger watersheds decreases. The magnitude of any affect is generally proportional to the area that is treated. Since this project impacts only 10% (573 acres) of the Upper Tioga Creek drainage and only 6% (182 acres) of the Goose Gulch drainage and only 1% (24 acres) of the Bear Gulch drainage it is not possible to separate these cumulative effects from natural variability at the subwatershed or the watershed scale.

### ***Impacts on Rural/Forest Interface***

#### No Action Alternative

No effects are anticipated from the No Action Alternative.

#### Action Alternatives

No effects are anticipated from the Action Alternatives.

### ***Impacts on Recreation***

#### No Action Alternative

No effects are anticipated from the No Action Alternative.

#### Action Alternatives

The proposed Tioga Special Recreation Management Area would not be affected.

Visitor observations by staff and volunteers indicate users are generally local, regional, or return visitors. They are aware of the single lane roads built for logging, and steep slopes requiring caution. Standard safety measures used during logging operations appear to be adequate.

Direct impacts include possible short delays in travel due to equipment on the roads. The activity and noise associated with logging may encourage some visitors to go elsewhere.

Indirect or cumulative impacts to recreation would most likely be associated with hunters responding to changes in game animal movements.

#### ***Impacts on Environmental Justice***

##### No Action Alternative

No effects are anticipated from the No Action Alternative.

##### Action Alternatives

There are no identified significant adverse/disproportional human health or environmental effects associated with the Action Alternatives for low income or minority groups.

#### ***Impacts on Cultural Resources and Native American Religious Concerns***

##### No Action Alternative

No effects are anticipated from the No Action Alternative.

##### Action Alternatives

No effects are anticipated from any of the Action Alternatives.

#### ***Impacts on Air Quality***

##### No Action Alternative

No effects are anticipated from the No Action Alternative.

##### Action Alternatives

Burning roadside slash piles in winter is not expected to adversely affect air quality if burning is accomplished according to a burn plan meeting Oregon Smoke Management regulations.

#### ***Impacts on Solid and Hazardous Waste***

##### No Action Alternative

No effects are anticipated from the No Action Alternative.

##### Action Alternatives

No effects are anticipated from any of the Action Alternatives.



### ***Irreversible and Irretrievable Commitment of Resources***

There are no irreversible and irretrievable commitment of resources beyond those identified in the RMP.

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### ***Chapter V - List of Agencies and Individuals Contacted***

The general public was notified of the planned EA through the publication of Coos Bay District's semi-annual *Planning Update*.

The only adjacent landowner, Weyerhaeuser Company, North Bend, Oregon, was contacted during the Scoping process:

The following public agencies and interested parties were notified with e-mail scoping letters:

- S Coast Range Association
- S Confederated Tribes of Coos, Umpqua, and Siuslaw Indians
- S Division of State Lands
- S Umpqua Watersheds
- S Pam Hewitt
- S Oregon Natural Resources Council
- S Department of Land Conservation and Development
- S Department of Forestry
- S Hugh Kern
- S Sierra Club, Many Rivers Group

The following public agencies and interested parties were notified with scoping letters:

- S The Coquille Indian Tribe
- S Association of O&C Counties  
Attn: Rocky McVay Exec. Dir.
- S USDI Bureau of Indian Affairs
- S Donald Fontenot
- S Kalmiopsis Audubon Society  
Attn: Sunshine Kesey
- S Kalmiopsis Audubon Society  
Attn: Basil Andrews

The proposed project was reviewed by the U.S. Fish and Wildlife Service through the consultation process provided under section 7(A)(4) of the Endangered species Act of 1973.

The proposed project was reviewed by the National Marine Service through the consultation process provided under section 7(A)(4) of the Endangered species Act of 1973.

Literature Cited:

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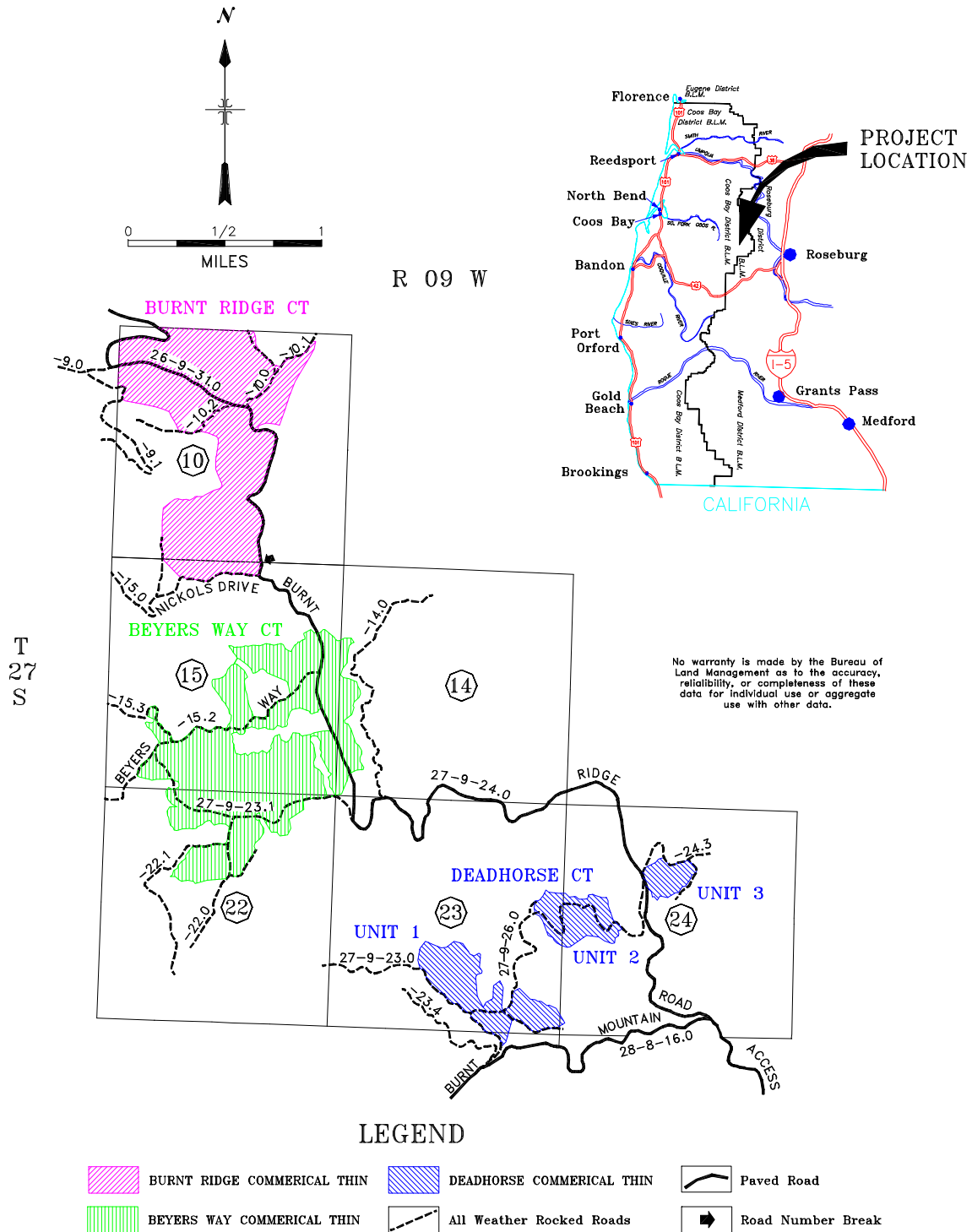
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GENERAL LOCATION MAP  
T27S R09W Sec. 10,14,15,22,23,24 W.M.

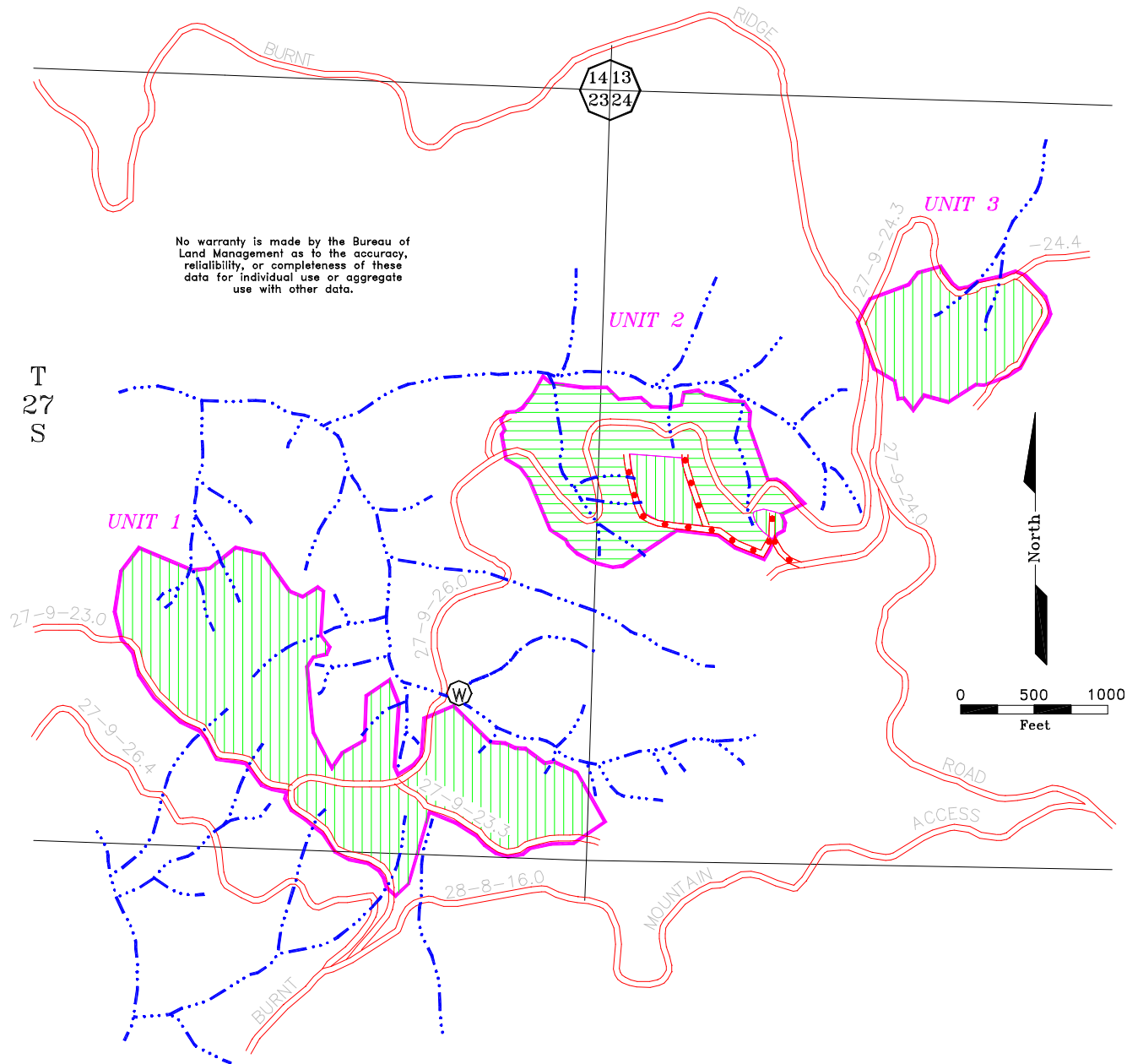
TIOGA CREEK CT's  
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HARVEST SYSTEMS & NEW ROAD CONSTRUCTION  
T. 27 S., R. 9 W., Sec. 10,14,15,22,23,24 Will. Mer.

TIOGA CREEK CT's  
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DEADHORSE CT  
R 09 W



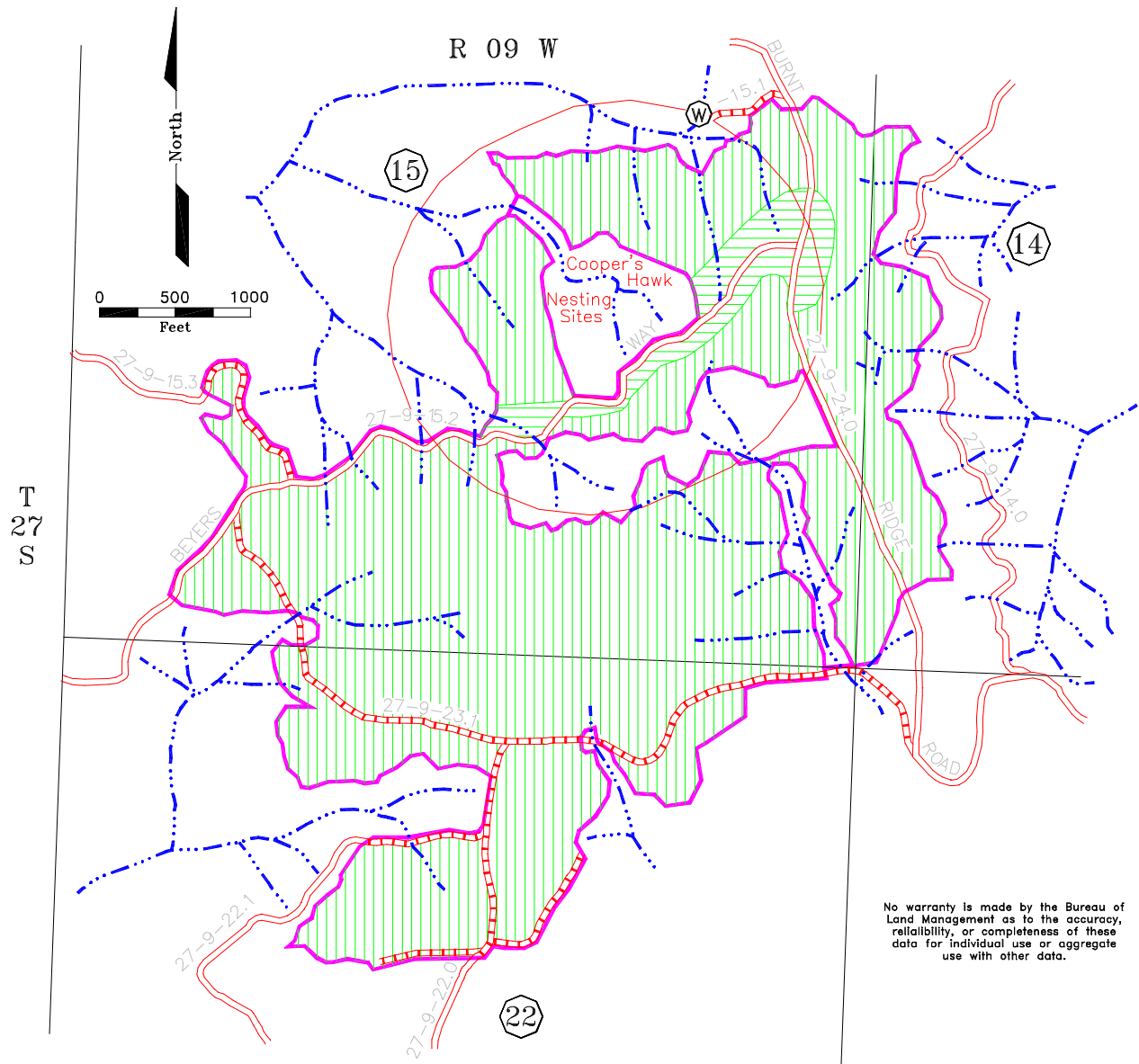
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	All Weather Road		Skyline Cable System		Road Number Break
	Road to be Constructed		Cut-to-Length Harvester System		Water Hole
	Road to be Renovated		Proposed Sale Boundary		Stream

HARVEST SYSTEMS & NEW ROAD CONSTRUCTION  
T. 27 S., R. 9 W., Sec. 10,14,15,22,23,24 Will. Mer.

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BEYERS WAY CT



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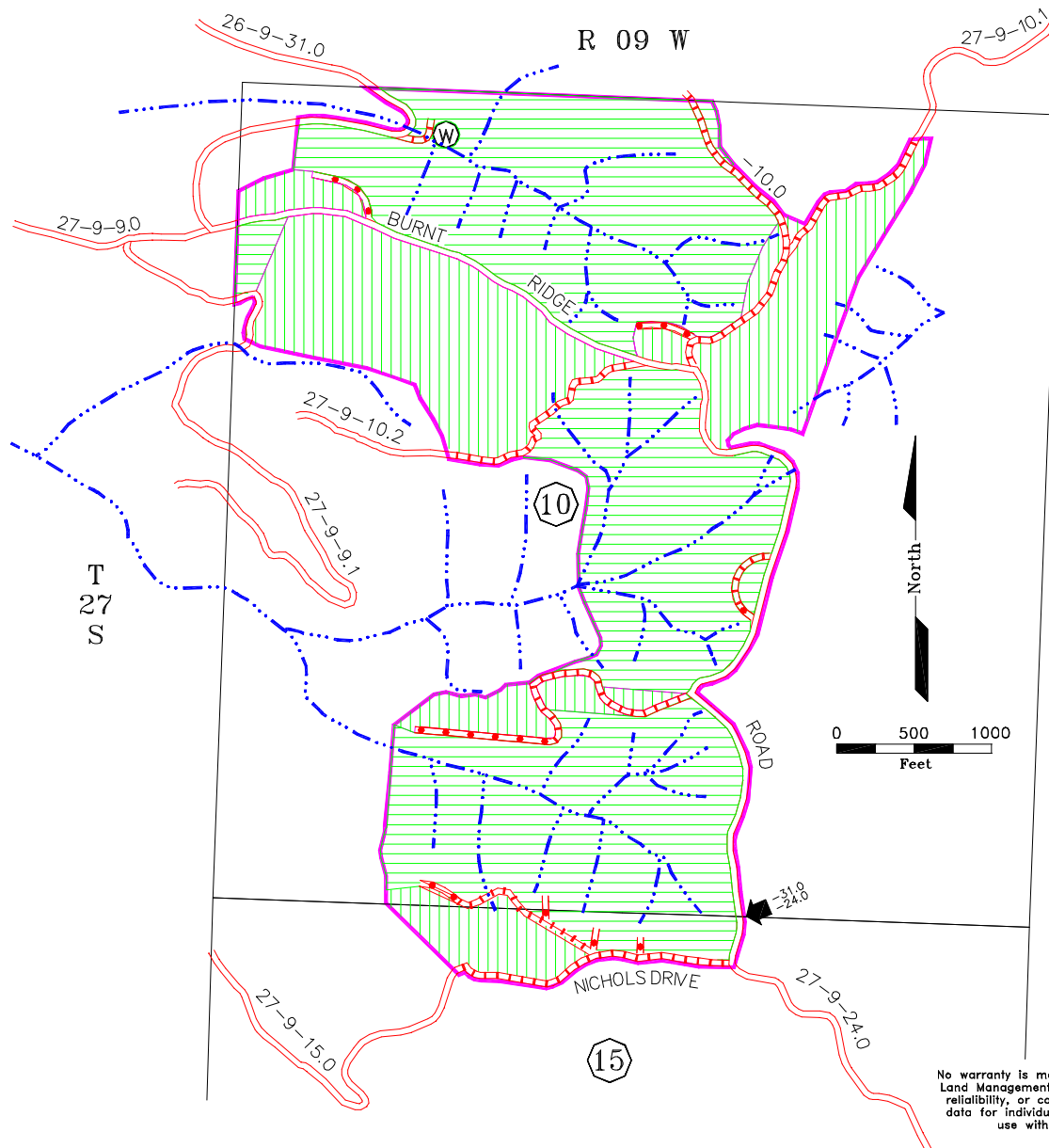
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	All Weather Road		Skyline Cable System		Road Number Break
	Road to be Constructed		Cut-to-Length Harvester System		Water Hole
	Road to be Renovated		Proposed Sale Boundary		Stream

HARVEST SYSTEMS & NEW ROAD CONSTRUCTION  
T. 27 S., R. 9 W., Sec. 10,14,15,22,23,24 Will. Mer.

TIOGA CREEK CT's  
EA OR125-98-01

## BURNT RIDGE CT



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### Legend

	All Weather Road		Skyline Cable System		Road Number Break
	Road to be Constructed		Cut-to-Length Harvester System		Water Hole
	Road to be Renovated		Proposed Sale Boundary		Stream

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